Western River Basin District

Final River Basin Management Plan for the Western River Basin District in Ireland (2009-2015)

December 2009

Acknowledgement:

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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 Western 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 the 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

AA	Appropriate Assessment for Natura 2000 sites as required under the Habitats Directive
Acidification	The rough canopies of mature evergreen forests are efficient scavengers of particulate and gaseous contaminants in polluted air. This results in a more acidic deposition under the forest canopies than in open land. Chemical processes at the roots of trees, evergreens in particular, further acidify the soil and soil water in forest catchments. When the forests are located on poorly buffered soils, these processes can lead to a significant acidification of the run-off water and consequent damage to associated streams and lakes.
Alien species	Invasive alien species are non-native plants or animals that successfully establish themselves in aquatic and fringing habitats and damage our natural flora and fauna.
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.
Coastal Waters:	Is that area of surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward 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.
DECNR:	Department of Energy, Communications and Natural Resources.
DEHLG:	Department of the Environment, Heritage and Local Government.
Diffuse sources (of pollution):	These are primarily associated with run-off and other discharges related to different land uses such as agriculture and forestry, from septic tanks associated with rural dwellings and from the land spreading of industrial, municipal and agricultural wastes.
Ecology:	The study of the relationship among organisms and between those organisms and their non-living environment.
Ecosystem:	A community of interdependent organisms together with the environment they inhabit and with which they interact, and which is distinct from adjacent communities and environments
Ecological status:	Is an expression of the structure and functioning of aquatic ecosystems associated with surface waters. Such waters are

	classified as being of good ecological status when they meet the requirements of the Directive.
EPA:	Environment Protection Agency
Eutrophic:	A eutrophic lake is a lake with high primary productivity, the result of high nutrient content.
Eutrophication:	Enrichment of water by nutrients (phosphorus and nitrogen). The nutrients accelerate plant growth, which disturbs the balance of aquatic plants and animals and affects water quality.
Fisheries:	Regional Fisheries Boards (Western Regional Fisheries Board and the North Western Regional Fisheries Board in the Western District).
Forest Service:	The Forest Service of the Department of Agriculture, Fisheries and Food.
Good status:	Is a general term meaning the status achieved by a surface water body when both the ecological status and its chemical status are at least good or, for groundwater, and when both its quantitative status and chemical status are at least good.
Groundwater:	All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil. This zone is commonly referred to as an aquifer which is a subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow a significant flow of groundwater or the abstraction of significant quantities of groundwater.
GSI:	Geological Survey of Ireland.
Heavily modified water body:	If, as a result of physical alterations by human activity, a water body is changed substantially in character it as designated by an individual Member State and in accordance with the provisions of Annex II of the Water Framework Directive.
HSE:	Health Service Executive.
Hydromorphology:	A study of the quantity and dynamics of water flow within a river/channel, lake etc that has variations in its width, depth, structure and substrate of bed and riparian zone
Inland Surface Waters:	All standing or flowing water on the surface of the land (such reservoirs, lakes, rivers and coastal waters) and all groundwater on the landward side of the baseline from which the breadth of territorial waters is measured.
Leachate:	The liquid produced when water percolates through any permeable material. It can contain either dissolved or suspended material, or usually both

Mitigation measures:	Measures to avoid/prevent, minimise/reduce, or as fully as possible, offset/compensate for any significant adverse effects on the environment, as a result of implementing a P/P.
DEHLG-DEHLG-NPWS:	National Parks and wildlife Service of the Department of Environment Heritage and Local Government
Oligotrophic:	Term applied to water bodies that are poorly nourished, unproductive.
OSWTS:	On-Site Wastewater Treatment Systems
Pesticide Control Service:	Pesticide Control Service of the Department of Agriculture, Fisheries and Food.
Programme of measure:	Defines in detail those actions which are required to achieve the environmental objectives of the Directive within a river basin district.
Quantitative status:	An expression of the degree to which a body of groundwater is affected by direct and indirect abstractions. If this complies with Directive requirements the status is good.
River Basin:	Means the area of land from which all surface water run-off flows, through a sequence of streams, rivers and lakes into the sea at a single river mouth, estuary or delta.
River Basin Districts (RBD):	administrative areas for coordinated water management and are comprised of multiple river basins (or catchments), with cross-border basins (i.e. those covering the territory of more than one Member State) assigned to an international RBD.
Sedimentation:	The deposition by settling of a suspended material
SNIFFER:	Scotland and Northern Ireland Forum for Environmental Research (SNIFFER).
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):	An area designated under the European Directive on the Conservation of Wild Birds.
Statutory Instrument:	Any order, regulation, rule, scheme or byelaw made in exercise of a power conferred by statute.
Surface water:	Means inland waters, except groundwater, which are on the land surface (such as reservoirs, lakes, rivers, transitional waters, coastal waters) which occur within a river basin.
Transitional waters**:**	Bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their vicinity to coastal waters, but which are substantially influenced by freshwater flows.

Water body**:**	A discrete and significant element of surface water such as a river, lake or reservoir, or a distinct volume of groundwater within an aquifer.
Water Framework Directive**:**	The Water Framework Directive is European legislation that promotes a new approach to water management through river basin planning. The legislation addresses inland surface waters, estuarine waters, coastal waters and groundwater.
Water Management Unit:	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 Western River Basin District is a largely rural area with many high quality waters and protected sites that depend on water. The fertile soils of the eastern part of the basin support agriculture whereas further west, the landscape is mountainous with many habitat protected areas. The basin has an extensive coastline and encompasses many offshore islands. The great natural beauty of the basin is a haven for a thriving tourist industry with many popular holiday resorts and with its waters providing major boating and fishing interests. Water is integral to the economy of the Western RBD, generating and sustaining wealth through activities such as agriculture, forestry, aquaculture, 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, lakes, groundwater, estuaries (transitional) and coastal waters. Member states must ensure that their waters achieve at least good status by 2015 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.

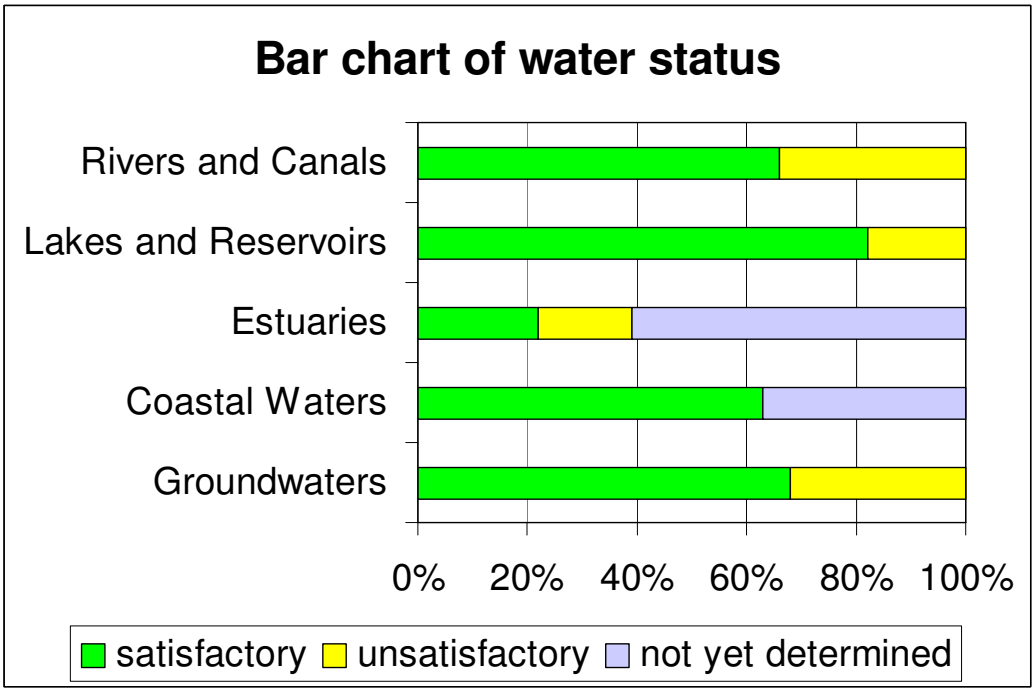
This plan is for the Western District of Ireland. It covers the period 2009–2015. The key parties in its implementation are:

- the district's local authorities Clare, Galway City, Galway County, Leitrim, Mayo, Roscommon and Sligo) which acted jointly to make the plan. Galway County Council, as the coordinating local authority will aim to coordinate the work of the authorities and public participation in the district;
- 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 Programme 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;
- individual Government Departments which have responsibility for implementing policy and programmes in their respective policy areas;
- 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 classified the surface waters in the Western District according to their ecological status and chemical status; groundwater is classified on a system that combines chemical and quantitative status. It found that:

- 66% of rivers, 82% of lakes, 28% of estuaries and 63% of coastal waters are satisfactory, with high or good ecological status;
- 34% of rivers, 17% of lakes, 10% of estuaries are less than good (moderate, poor or bad);

- most of the surface waters tested so far have good chemical status;
- 68% of groundwaters have good combined status.

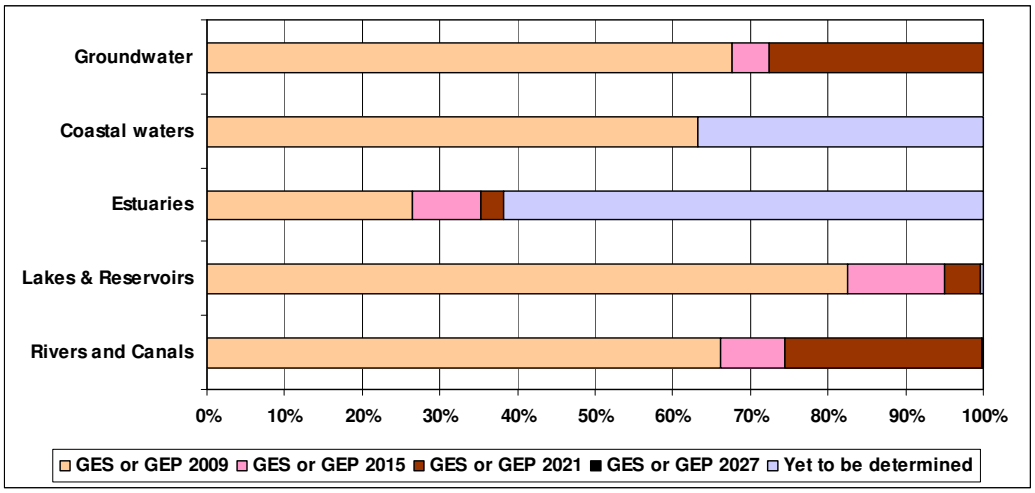


The final status assessment based on the data collected during the first monitoring cycle (2007-2009) will be presented by the EPA in 2011.

The Water Framework Directive sets out four core objectives to be achieved generally 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 implementing the measures in this plan will mean that good status will be achieved by 2015 in 74% of rivers, 95 % of lakes, 35% of estuaries, 63% of coastal waters and 68% of groundwaters, with further improvements during the second and third planning cycles. The expected trends in status over three planning cycles to 2027 are:



The draft plan aimed to achieve good status for 92% of rivers by 2015; in the final plan that proportion is 74%, with the step to 100% compliance to be achieved over the following two planning cycles to 2027. This change results from detailed consideration of the timescales in which recovery of status can be achieved.

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 Western RBD. 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 detailed 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 fourteen water management units in the Western RBD. The action plans for these WMUs 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

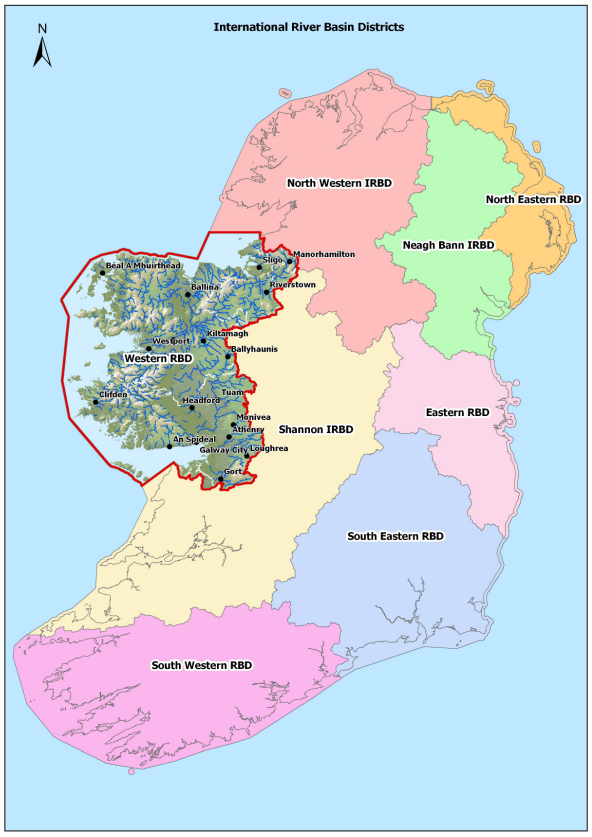
This River Basin Management Plan for the Western River Basin District, covering the period 2009 to 2015, aims to protect all waters within the district and, where necessary, improve waters and achieve sustainable water use. Waters include rivers, canals, lakes, reservoirs, groundwaters, protected areas (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" at the latest by 2027, 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 Western 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 do not respect administrative boundaries but are defined by catchment areas of rivers. There are eight river basin districts 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).



Map1.1 River Basin Districts

The Western District is wholly within the Irish Republic. It is bordered to the northwest by the North Western International River Basin District, to the east and south by the Shannon International River Basin District and to the north and west by the Atlantic Ocean. The basin area includes practically all of Mayo and Sligo, the Galway Urban District area, significant

portions of Galway and Leitrim counties and smaller portions of Roscommon and County Clare. It also includes offshore islands such as the Aran Islands and Inishboffin.

The basin area extends over some 12,193 km2 square kilometres with some 2,700 km of coastline and an extensive off shore area. Large areas of the district have been designated as Special Areas of Conservation (SAC) under the European Union (Natural Habitats) Regulations, 1997 and Natural Heritage Areas (NHA), designated under the Wildlife (amendment) Act 2000. Special attention must be paid to the needs of these areas where species are dependent on the water habitat resulting in receptor water bodies been designated as more sensitive to pressures.

The basin is dominated in the eastern part, east of the great western lakes, principally by well drained karst limestone overlain by grassland generally used for agricultural purposes. This area stores large quantities of groundwater which both feeds into the lake systems and also provides a significant source of drinking water to the region. The western part of the basin is dominated by wet peatland and forestry.

The basin is relatively sparsely populated, less than half a million people, with urban infrastructure comprising about 0.03% of the basin area. The principal urban areas are Galway City, Castlebar, Sligo, Oughterard, Tuam, Ballinrobe, Ballina, Gort, Loughrea, Westport, Clifden, Swinford, Tobercurry, Ballaghadereen, Ballyhaunis and Claremorris. The major urban areas are located largely on the Coast or beside rivers but many people live in small villages or single dwellings.

The fertile soils of the eastern part of the basin support beef, dairy sheep, and some pig farming as well as minor crop cultivation. Further west, the landscape is mountainous with many coniferous forest plantations and some sheep and cattle grazing. The great natural beauty of the basin is a haven for a thriving tourist industry with many popular holiday resorts. In particular the Moy River is renowned internationally as a salmon fishery and is closely followed by the Corrib, Mask and Conn lake systems, which provide major boating and fishing interests.

1.2 The authorities and their roles

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

This plan has been developed by the county councils of Clare, Galway, Leitrim, Mayo, Sligo and Roscommon and by Galway City Council. These local authorities, acting jointly, are the competent authorities for making this plan as defined by the *European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003)*. Similar plans have been drawn up by councils in the adjoining districts (the Shannon IRBD and North Western IRBD).

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 any river basin management plan.

Galway County Council is the coordinating local authority in the Western RBD. 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. The Environmental Protection Agency's powers, under Section 63 of the EPA Act (No 7 of 1992), as amended by the Protection of the Environment Act (No 27 of 2003), authorise them 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 Water plays a significant role in determining priority for investment in infrastructure and the availability of resources to local authorities.

Individual Government Departments have responsibility for implementing policy and programmes in their respective policy areas.

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 groundwater 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. Where protected areas (for example bathing waters, shellfish waters, water dependent Natura 2000 sites) were impacted by discharges these were also taken into account;

- Preparation of catchment management plans for designated freshwater pearl mussel populations and Pollution Reduction Plans 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 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 Western River Basin District in Ireland [2006];*
- 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! Western River Basin District [2007];*
- a summary of consultations and stakeholder engagement, *Digest of submissions and responses to Significant Water Management Issues Reports for Ireland, Western River Basin Districts [2008];*
- the strategic environmental assessment scoping process; *Strategic Environmental Assessment for the Water Framework Directive River Basin Management Plans and Programmes of Measures - Western – Scoping Document [2008];*
- the draft river basin management plan; *Water Matters "Help Us Plan!" Draft River Basin Management Plan for the Western 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 - Western – 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 Western 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 Water Framework Directive activities. SWAN (Sustainable Water Network) www.swanireland.ie 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 plans were also considered by a Public Authorities 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 public meetings:

Date	Location	Venue
27 April 2009	Sligo Town	Sligo Park hotel
29 April 2009	Castlebar, Co. Mayo	Regional Training Centre
30 April 2009	Galway City	County Hall, Prospect Hill

A total of 43 submissions were received in relation to the draft River Basin Management Plan for the Western RBD 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 are 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 Western RBD 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 Western RBD 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 Western RBD

2.1 The Waters of the Western District

2.1.1 Surface waters

The District is rich in waters comprising 89 river catchments with over 14,200 km of river. It has both lowland rivers (wide valleys, slow flows) and upland rivers (steep valleys, flashy flows). The main rivers are the Corrib; draining Lough Corrib, Mask and Carra, the Moy; draining Lough Conn and Cuilin, Owenmore/Ballysadare, Dunkellin and Bonet. Smaller catchments, such as the Erriff, drain directly in the coastal areas to the sea. Some river systems like the Gort River draining the Slieve Aughty Mountains in the south of the basin drain to the sea via underground routes. The main lakes are the Corrib (165 km2), Conn (107 km2),) Mask (82 km2), Carra (15 km2), Gill (14 km2), Arrow (12 km2) Cuilin (10 km2) and Carrowmore (9 km2). These are important fisheries recreational waters but also provide the sources of major regional water supplies.

The 4,707 km2 of marine waters are mostly off the coasts of Sligo, Mayo, Galway and Clare. Major features include many islands, headlands and inlets, Ballyvaughan Bay, Sligo, Bay Killala Bay, Blacksod Bay, Clew Bay, Killary Harbour, Cill Chiaráin Bay, Galway Bay, Kinvara Bay and the Moy and Corrib estuaries.

2.1.2 Groundwaters

There are 105 groundwaters in the Western RBD ranging in size from less than 1km2 to over 1350 km2. In the east of the District, including the area east of the Great Western Lakes of Corrib, Mask and Carra, permeable rocks and soils allow groundwater to be stored in underground aquifers and these provide significant drinking water supply. Similarly the main groundwater bodies in the North Clare/Burren area also comprise permeable rocks overlain by thin soils. Elsewhere, in Connemara for example, the rocks and soils hinder water seepage, so aquifers are generally of low yield.

2.1.3 Heavily modified and artificial waters

No surface waters in the District are regarded as being substantially changed **(heavily modified** is the term used) but Lower Lough Corrib and the Corrib River are strong candidates for future designation as the sluice barrage at Galway City controls their water level. Only two waters are man made (**artificial**), the Eglington and Cong Canals. The benefits from such modifications need to be retained, so these waters are subject to a different set of standards.

2.1.4 Protected areas

A significant proportion of waters in the district are already protected under other legislation because 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 Western RBD have been identified, mapped and listed in a *register of protected areas background document* (available at www.wfdireland.ie). They include the Moy and Corrib systems (important freshwater fish systems) and Shellfish waters such as Aughinish Bay, Inner Galway Bay South, Cill Chiaráin Bay, Killary Harbour, and Newport Bay. Lough Corrib, Lough Mask, Lough Rea and Lough Gill are important sources of drinking water. There are many special areas of conservation, including the Connemara Bog Complex, Twelve Bens/Garraun Complex, Mweelan/Nephin Complex, Glenamoy Bog Complex, Ox Mountains Bogs and the

Ben Bulben, Gleniff and Gelnade Complex. They also include four Freshwater Pearl Mussel catchments protected under the EU Habitats Directive, (the Owenriff and Dawros catchments in County Galway and the Bundorragha and Newport catchments in County Mayo).

Table 2.1 Protected Areas in the Western District

Protected Area	Implementing Legislation	Number
Drinking waters	The European Communities (Drinking Water) (No. 2) Regulations 2007 (SI 278 of 2007)	167 surface 105 groundwater
Shellfish waters	European Communities (Quality of Shellfish Waters) Regulations 2006 (SI 268 of 2006) as amended in 2009	17
Bathing waters	Bathing Water Quality Regulations SI 79 of 2008	31
Nutrient sensitive areas	Urban Waste Water Treatment Regulations 2001 (SI 254 of 2001) as amended in 2004 (S.I. 440 of 2004) and 2010 (S.I. 48 of 2010).	1
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)	121
Special protection areas	European Communities (Natural Habitats) Regulations, SI 94 of 1997 as amended in 1998 and 2005	38

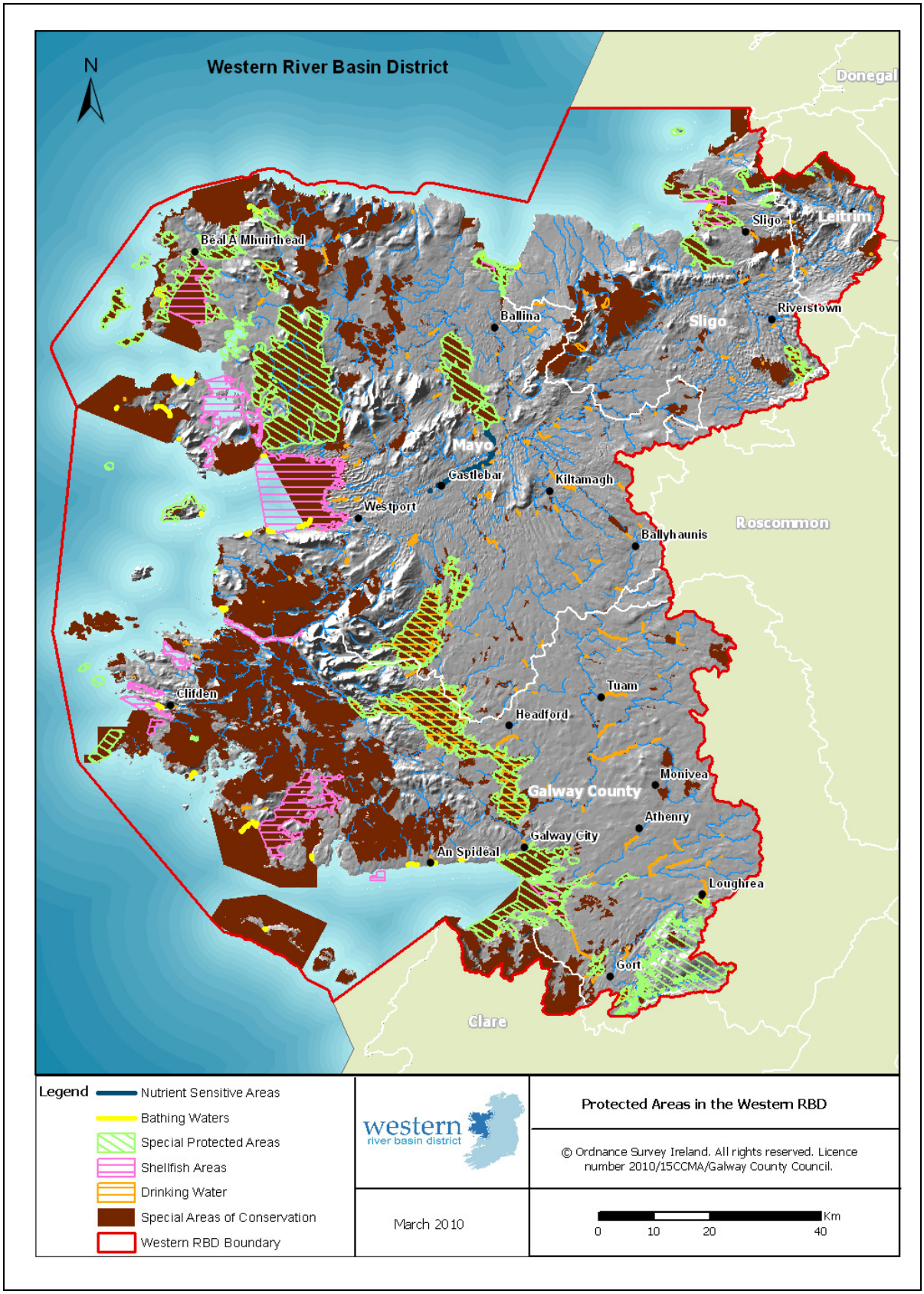
2.2 Key issues in the Western RBD

The key water management issues in the Western RBD 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.

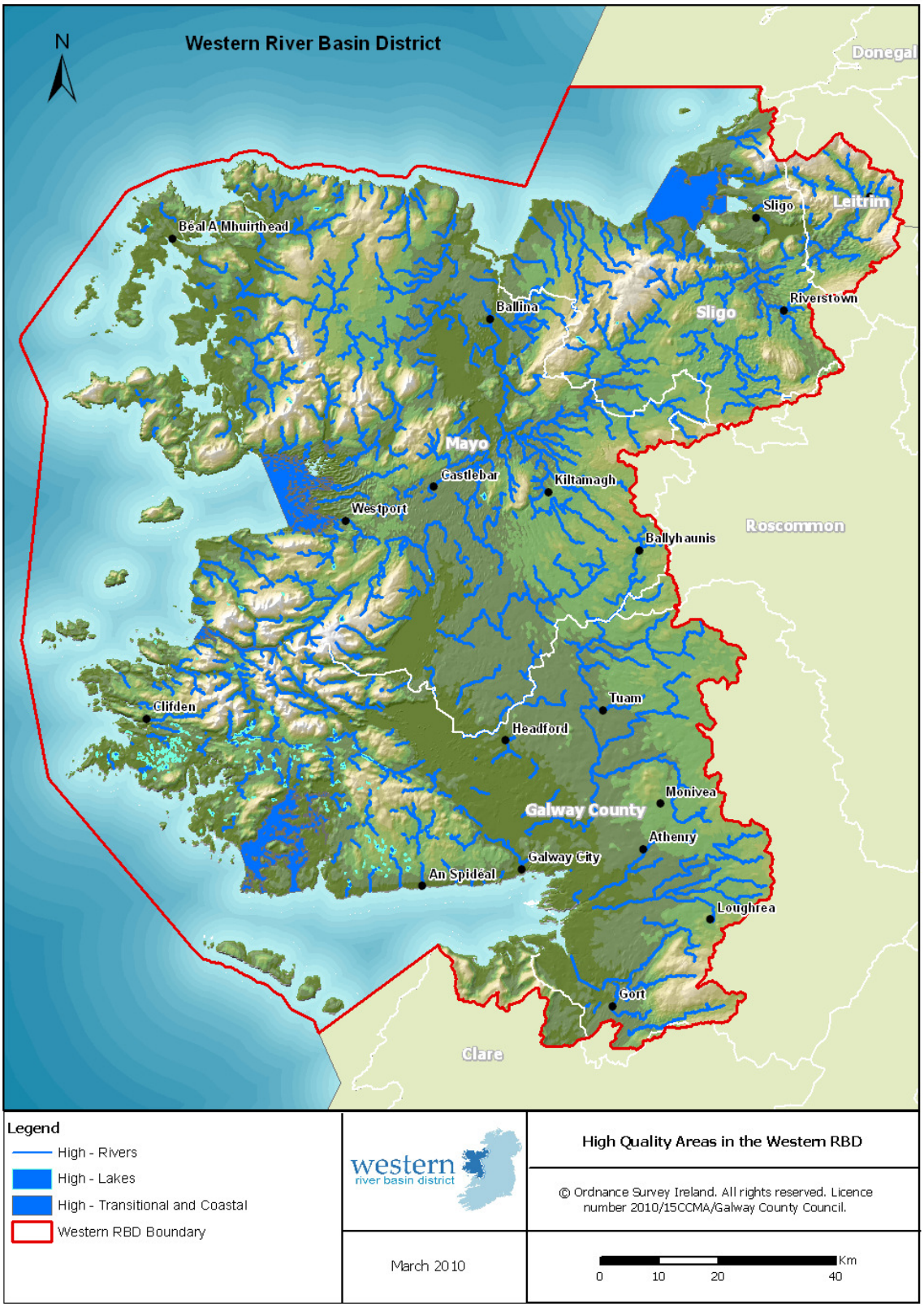
2.2.1 Protecting high quality areas

In the Western RBD there are 185 rivers (19.2%) that are classified by the EPA as high status. Of the lakes, estuaries and coastal waters surveyed 188 lakes (58.64%), 7 estuaries (10.3%) and 13 coastal waters (43.3%) are classified 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 Western RBD is one of the districts that has seen the greatest decline in high quality river sites. High quality areas include rivers, lakes and estuarine and coastal areas little affected by human activity; they are still at or near un-impacted 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 Western RBD are shown in Map 2.3.

Map 2.1 The Western River Basin District



Map 2.2 Protected areas in the Western RBD



Map 2.3 High Quality Areas in the Western RBD

2.2.2 Pressures

Agriculture

The Environmental Protection Agency's diffuse risk model indicates that 91 rivers and 14 lakes in the Western RBD are at risk of failing to achieve the required standards due to diffuse pollution. Sources of diffuse pollution include agriculture, forestry, peatland and urban land uses. 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 Western RBD. 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. Overgrazing can increase erosion rates, significantly disturbing siltation and hydrology regimes, and can cause physical damage and loss of habitat in rivers. Agricultural land uses in the Western RBD are illustrated in Map 2.4.

Wastewater and industrial discharges

In the Western RBD there are 13 rivers are 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, Clifden 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. 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. Pollutants include nutrients, bacteria, organic materials and dangerous substances from homes and industries, metals and hydrocarbons from urban runoff and pesticides from parks, golf courses and gardens. The wastewater is treated, to remove many pollutants, then discharged to surface waters or, very occasionally, to groundwater. 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 Western RBD are illustrated in Map 2.5.

Wastewater from unsewered properties

In the Western RBD there are approximately 10,096 unsewered properties located in areas where the hydrogeological characteristics mean that inadequate percolation is available. There are 70 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 Western RBD are shown in Map 2.6.

Forestry

In the Western RBD there are 34,867 hectares of private forestry and 75,175 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 51 river 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 Western RBD.

Landfills, quarries, mines and contaminated lands

Assessments of groundwaters in the Western RBD indicate that 4 groundwater bodies are at risk of failing to achieve the required standards due to contamination from landfills. The status assessment by the EPA shows that 71 groundwaters (68%) in the Western RBD currently are at good status with 34 (32%) at bad 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. Quarries can also be significant sources of silt which can adversely affect downstream aquatic habitats and species. These issues are site specific; knowledge of these sites in the Western RBD (shown in Map 2.5) is being updated by the Environmental Protection Agency and local authorities to confirm impact and assess the scale of this problem, if any, and extent of the pressure.

Physical modifications and damage

In the Western RBD 18.7% of river channels have been drained. There are 150 rivers where water status has the potential to be impacted. 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. Map 2.8 shows the rivers that have been physically modified and coastline that has been reinforced in the Western RBD.

Water Abstractions

Most water abstractions are currently sustainable in the Western RBD, however abstraction poses a potential risk to 204 rivers and 24 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 Western RBD and the volumes of water abstracted.

Dangerous substances

Recently introduced dangerous substances monitoring programmes have identified one water body in the Western RBD, the Deel a tributary of the Moy , which is failing chemical status. As the monitoring programme is new the extent of the problem with dangerous substances is not known. 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.

Aquaculture

The Western RBD has 17 designated shellfish waters and 65 licensed fish 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 and Mayo also has high numbers of such 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 Western RBD.

Invasive alien species

The African Curly leaved pondweed (found in the upper part of Lough Corrib), and Zebra Mussels (Lough Corrib system, Lough Gill and Lough Arrow) have established in the Western District waters. Nationally the Environmental Protection Agency has identified eight key aquatic species of non-native animals or plants that have successfully established themselves in aquatic and fringing habitats and are damaging natural flora and fauna and poses the threat of spreading into more waters within the Western RBD. 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. The Western Regional Fisheries Board (WRFB) has developed a Biosecurity Plan for Lough Mask to prevent the spread of alien species to this important lake. The Central Fisheries Board are developing methodologies to check the spread of the African pondweed in Lough Corrib.

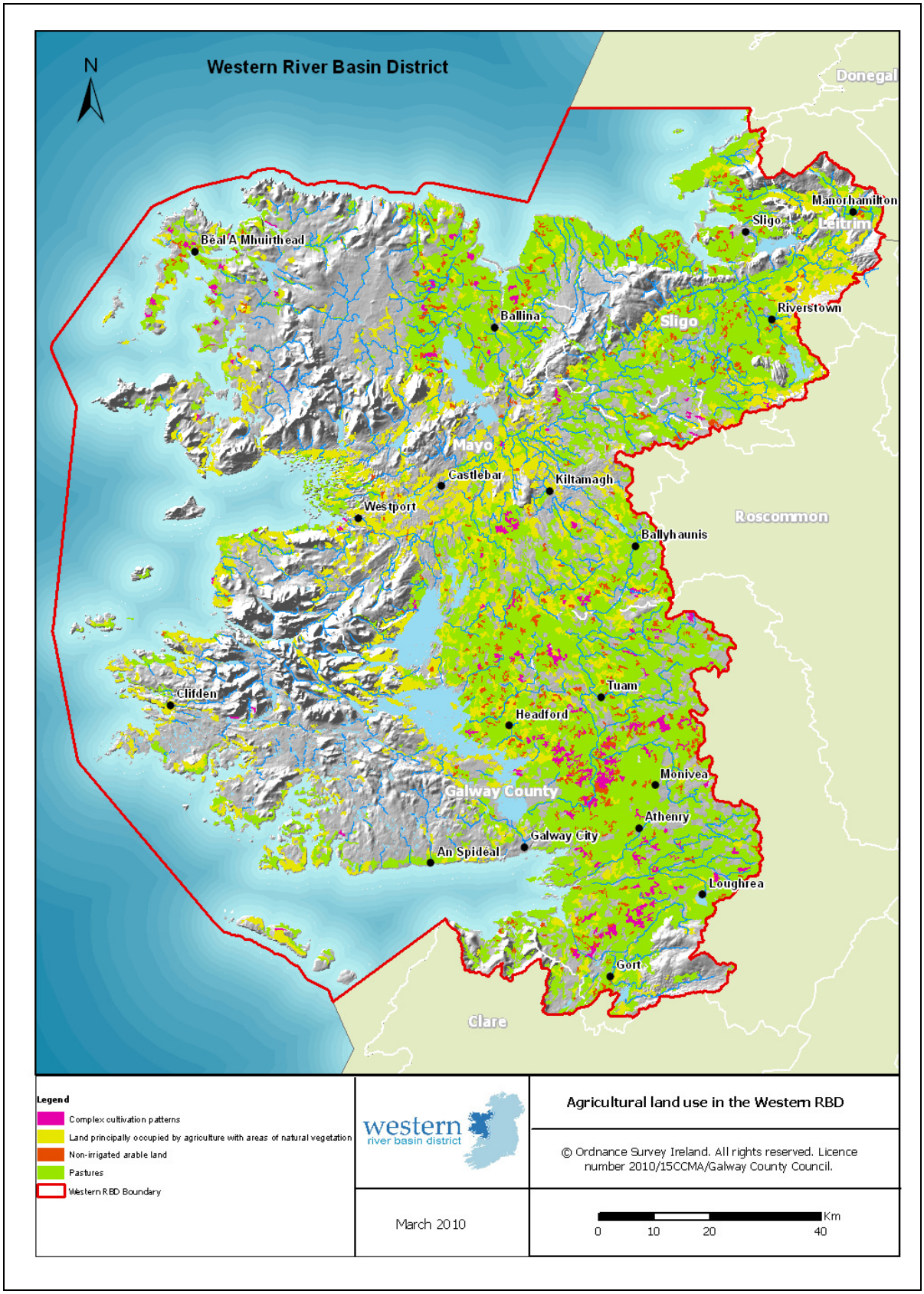
Cruising and boating

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

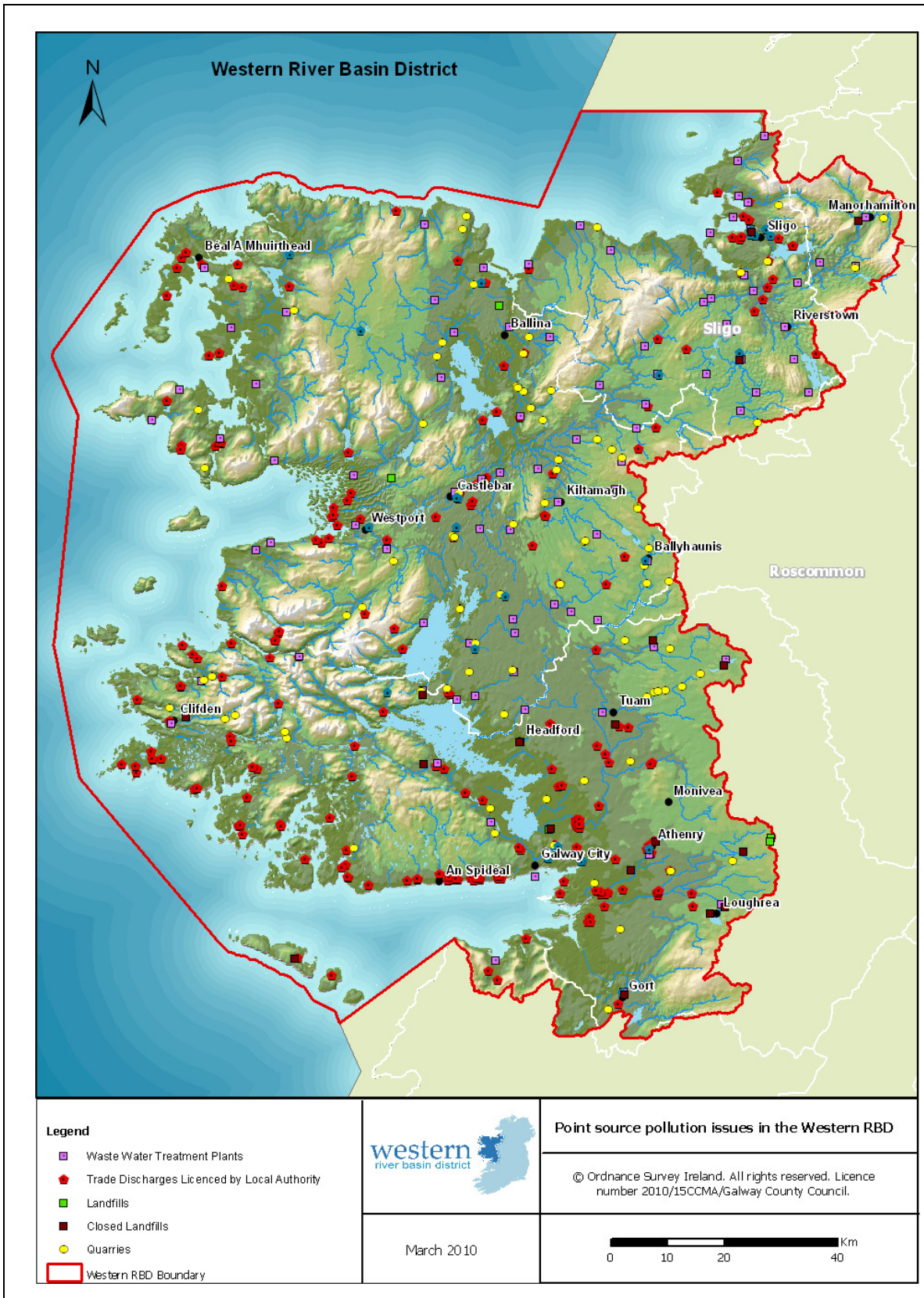
Climate change

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

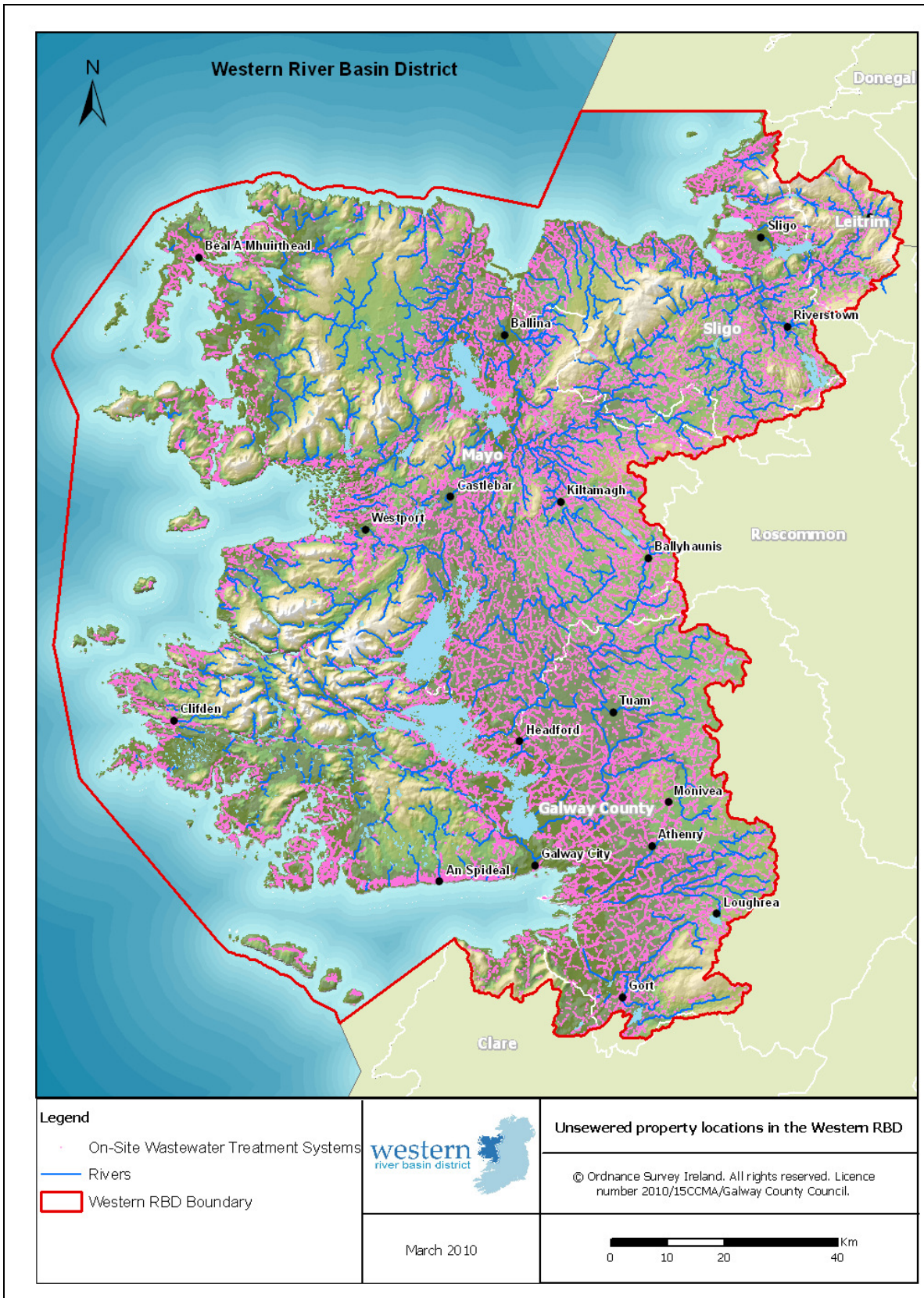
controls. Summer droughts are more likely and there may be a reduction in drinking water supplies. Temperature changes might give invasive alien species a competitive advantage, thus affecting biodiversity. Sea level rise may also impinge on water management. More detail on how climate change has been considered in developing these plans is provided in Chapter 6.



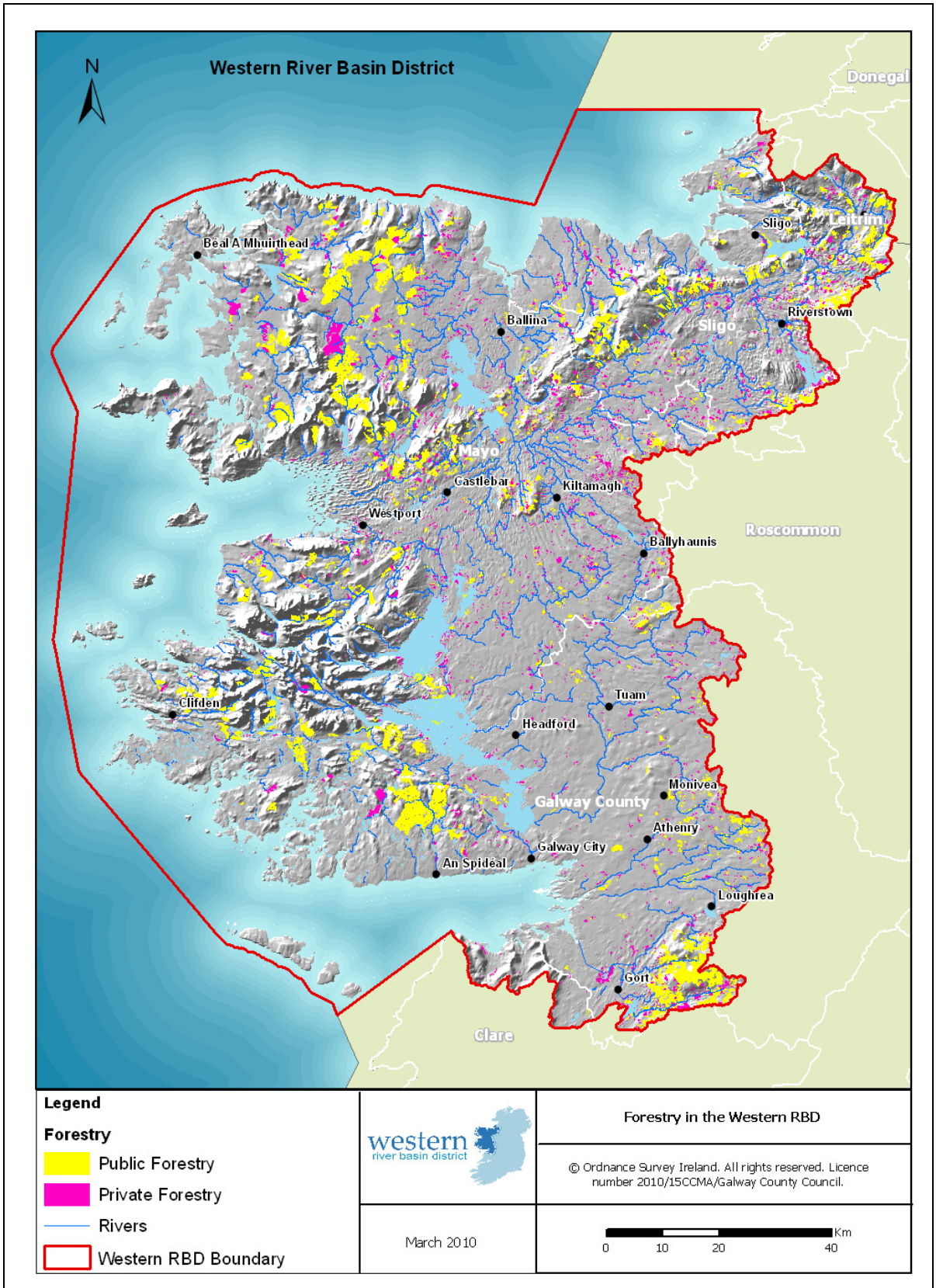
Map 2.4 Agricultural land uses in the Western RBD



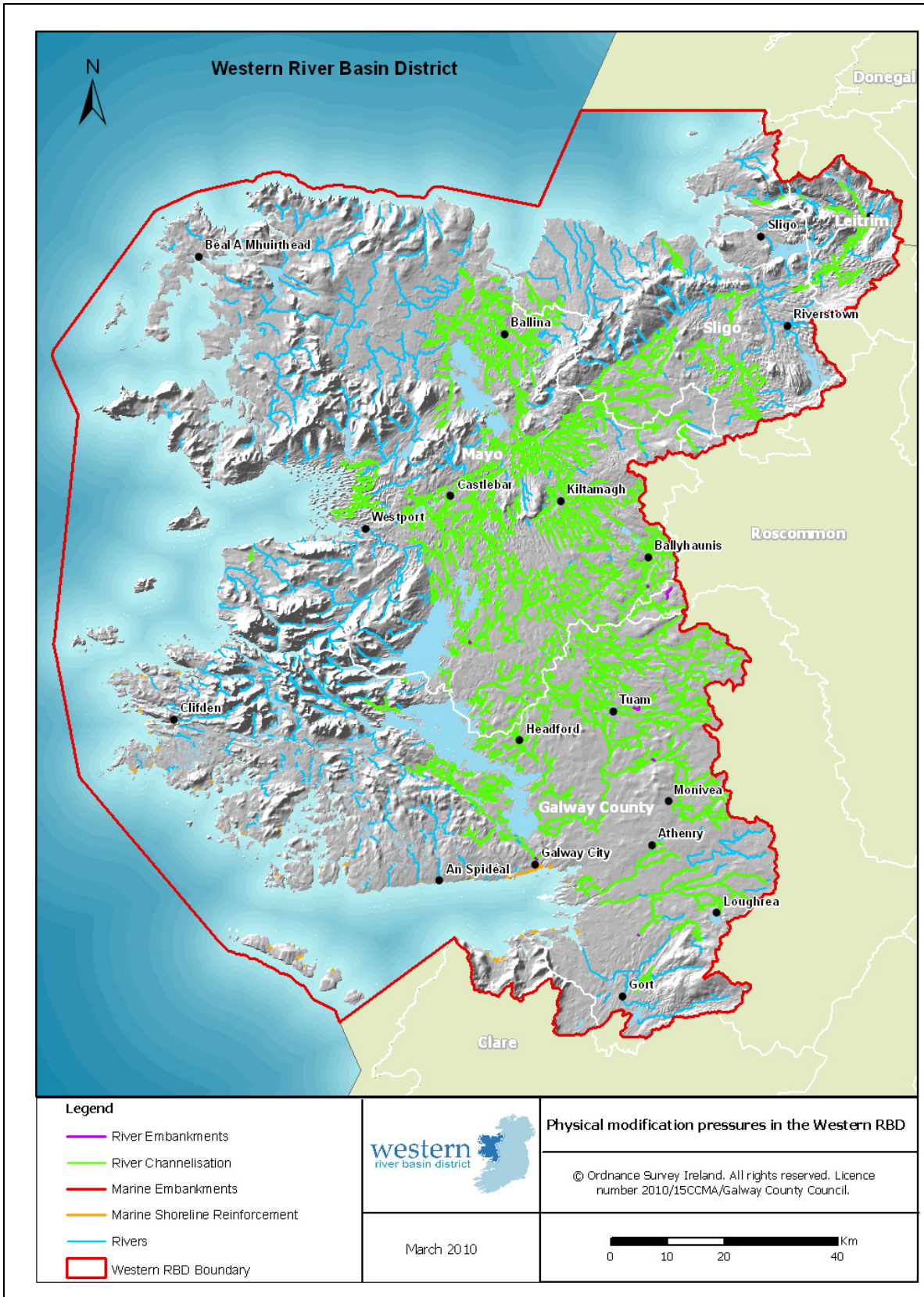
Map 2.5 Point source pollution issues in the Western RBD



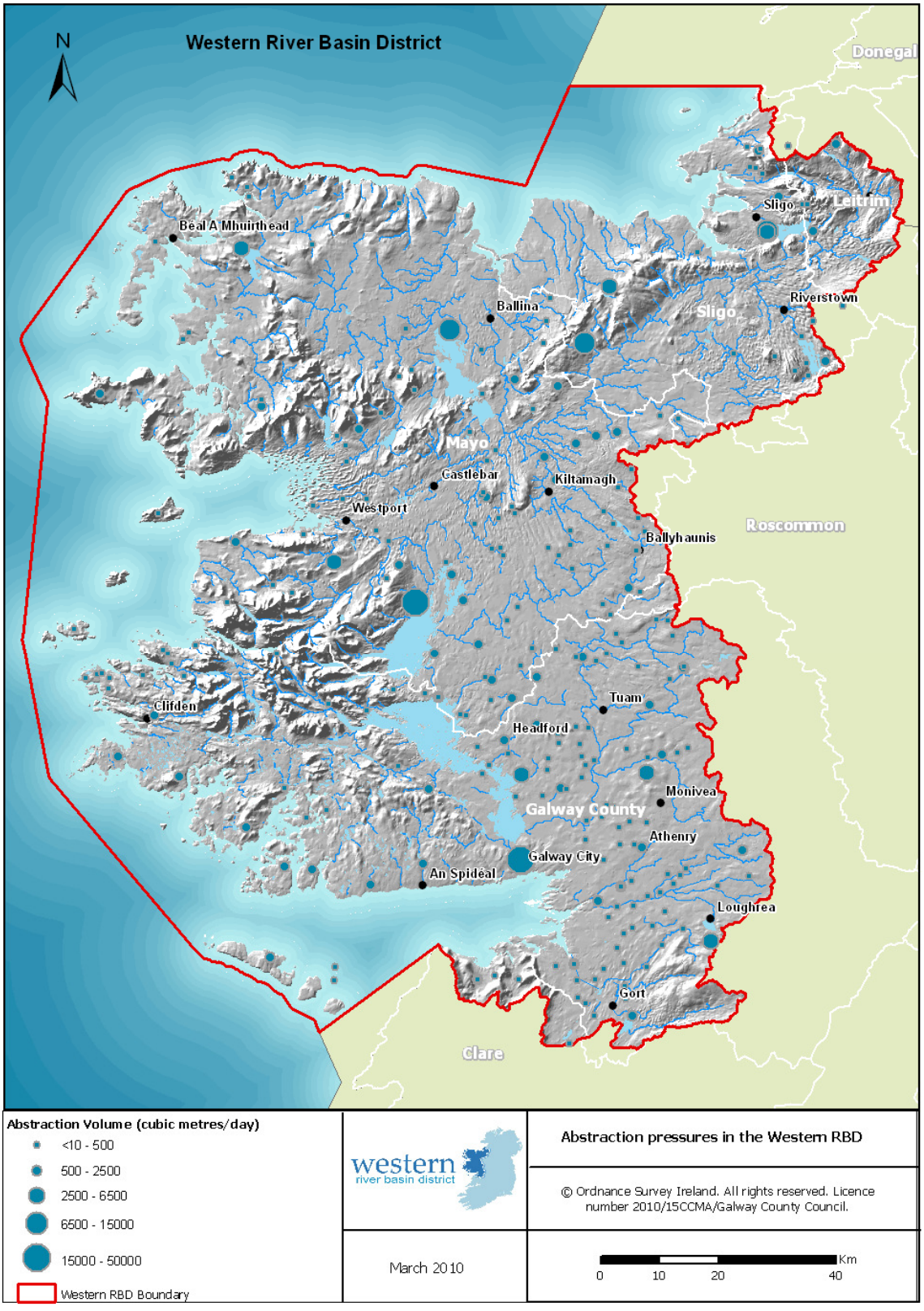
Map 2.6 Unsewered property locations in the Western RBD



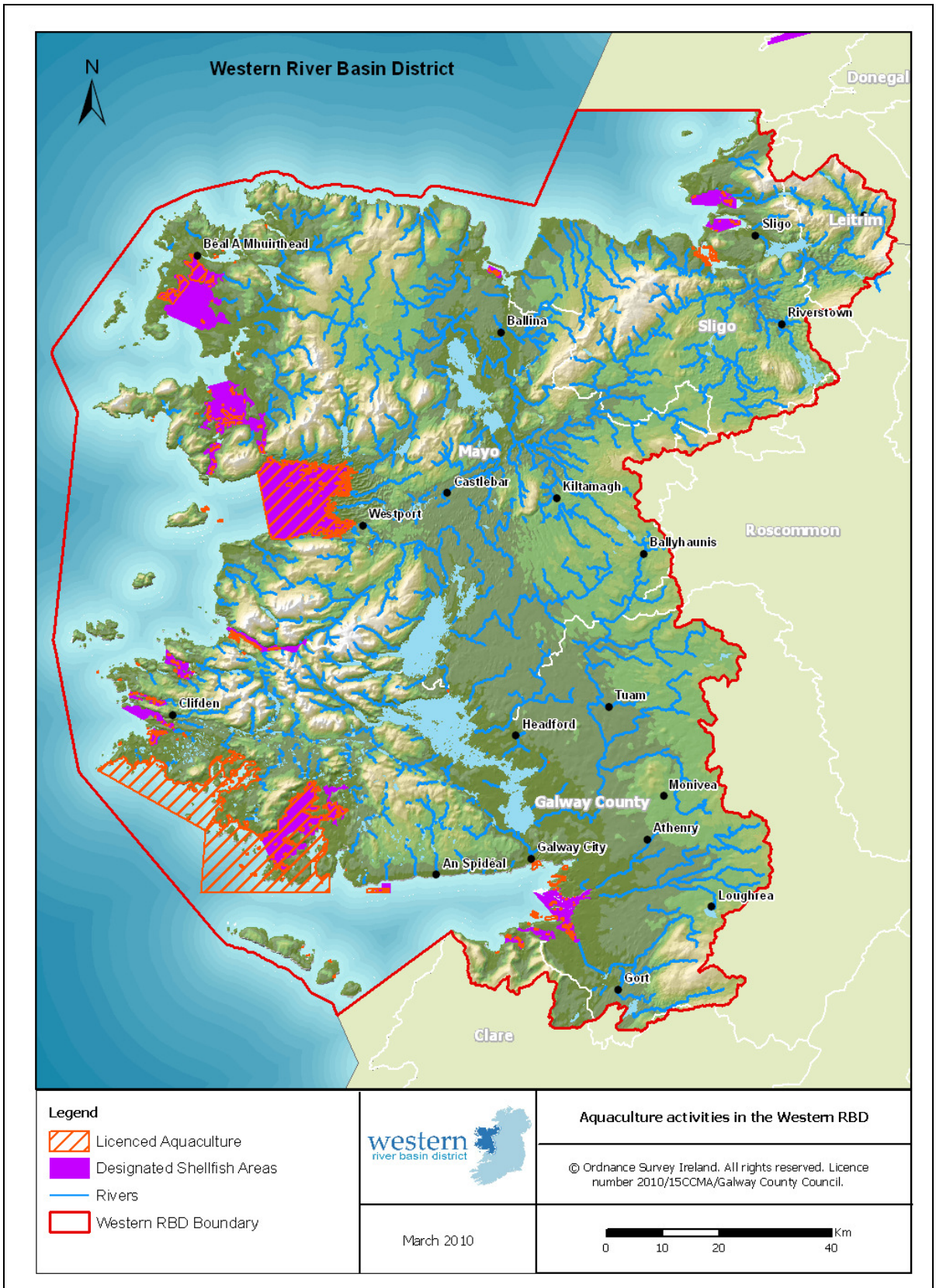
Map 2.7 Forestry locations in the Western RBD



Map 2.8 Physical modification pressures in the Western RBD



Map 2.9 Abstraction pressures in the Western RBD



Map 2.10 Aquaculture activities in the Western RBD

3 The status of the waters Of the Western RBD

3.1 Monitoring and Classification

The Environmental Protection Agency has developed a new, Water Framework Directive compliant, programme for the monitoring of water quality and quantity 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 replaced existing programmes for monitoring rivers and lakes, groundwaters ' and 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 Western RBD monitoring programme assesses 326 out of 963 river water bodies (at 600 sites), 76 out of 322 lakes, 19 out of 105 groundwater bodies (at 31 sites) and 17 out of 98 coastal and transitional water bodies (at 42 monitoring sites).

The Environmental Protection Agency has developed new biological classification systems for seven biological element descriptors (rivers – macroinvertebrates (quality element) and phytobenthos, 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.

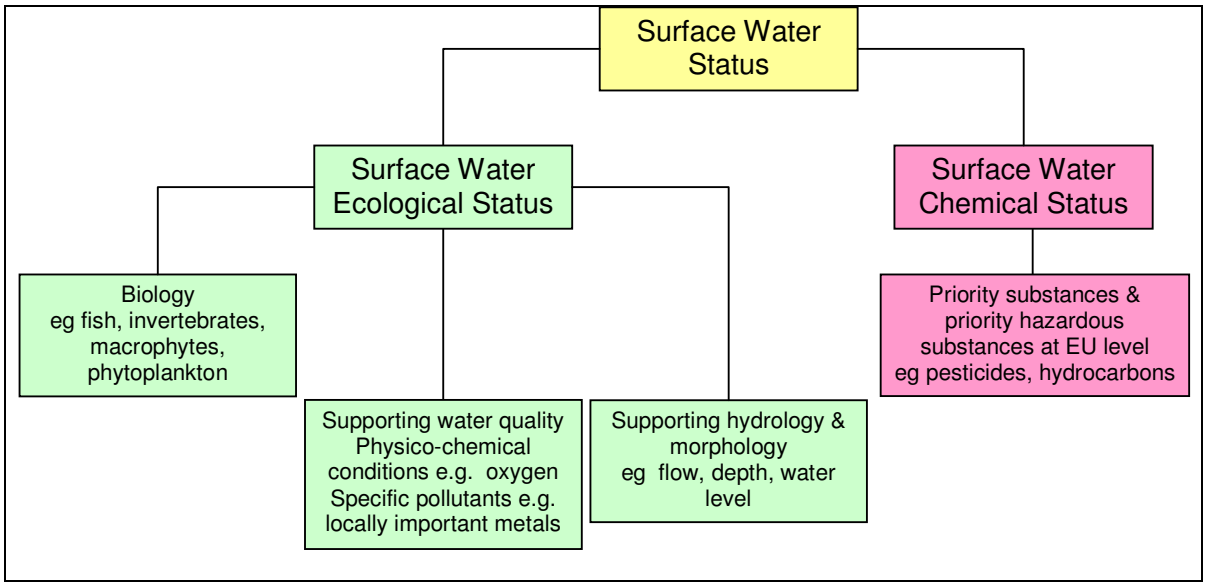
Details of the Water Framework Directive monitoring programme, new classification standards and the status setting process for surface and groundwaters are available in the *monitoring and status background documents* on www.wfdireland.ie.

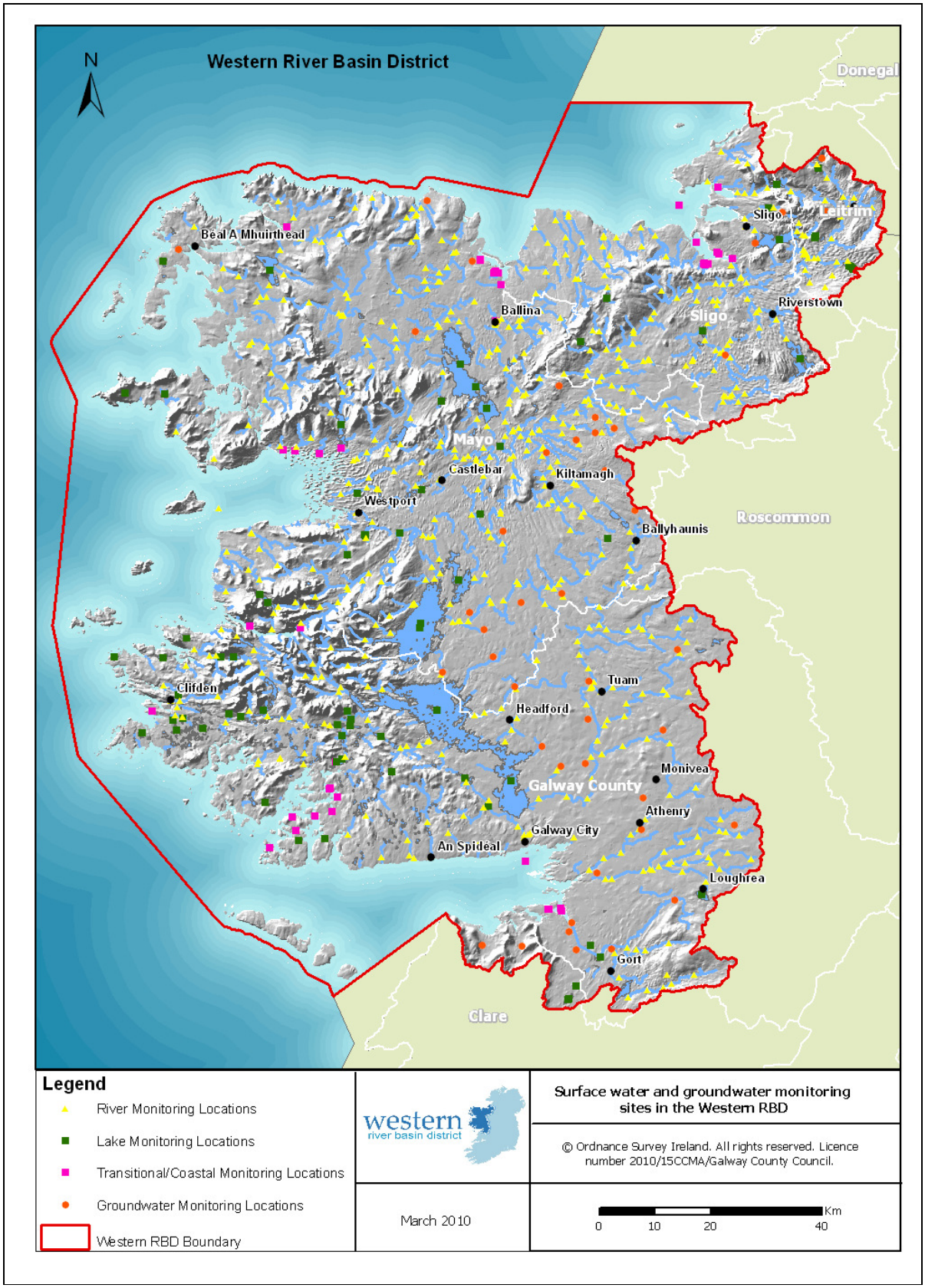
The Environmental Protection Agency has made interim status assessments of surface waters according to their ecological status and chemical status based on the results of the monitoring carried out in 2007 and 2008. Groundwaters have been assessed based on a system that combines chemical and quantitative status. This plan presents the best current understanding of status of the waters in the Western RBD 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

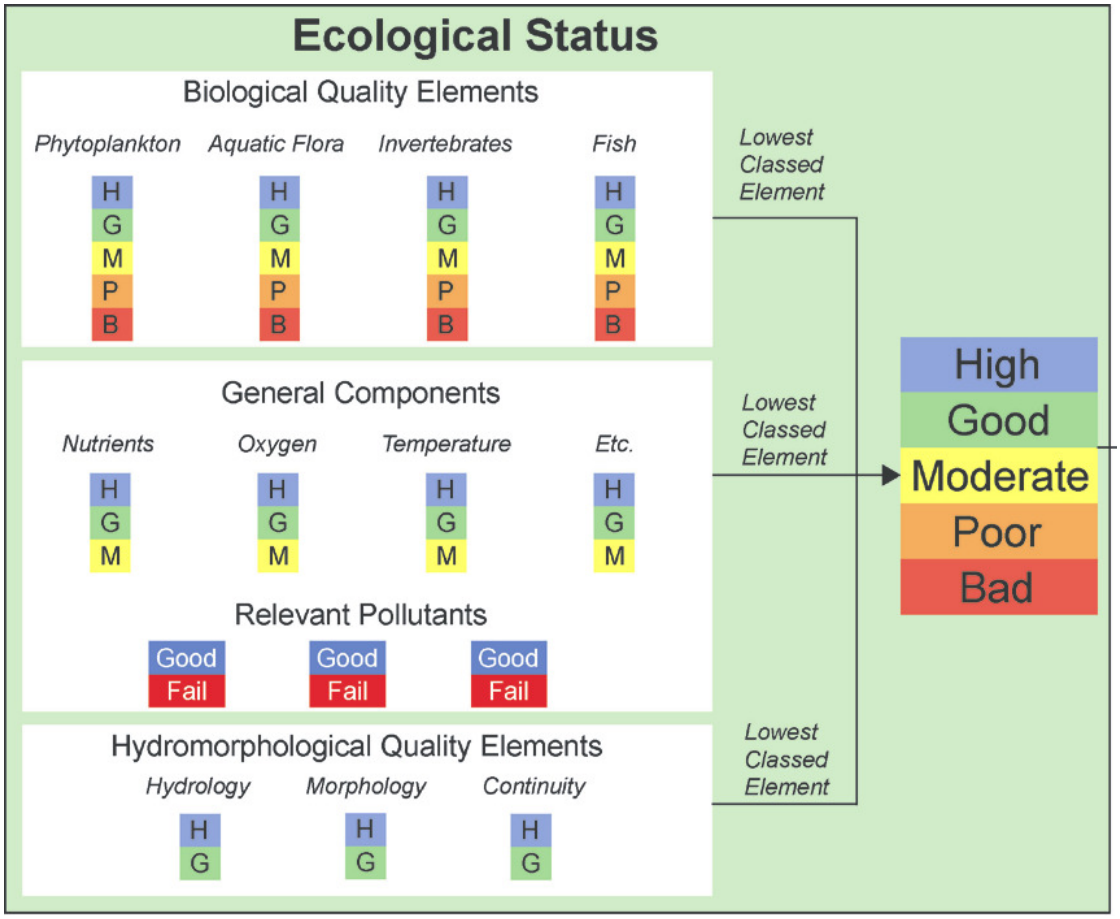




Map 3.1 Surface water and groundwater monitoring sites in the Western River Basin District

3.2.1 Surface water ecological status

Quality elements, representing plants, insects and fish, along with supporting water quality, hydrology and morphological conditions are sampled and analysed in rivers, canals, lakes, reservoirs, estuarine waters and coastal waters to allow water bodies to be classified into one of five classes of ecological status; high, good, moderate, poor and 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).

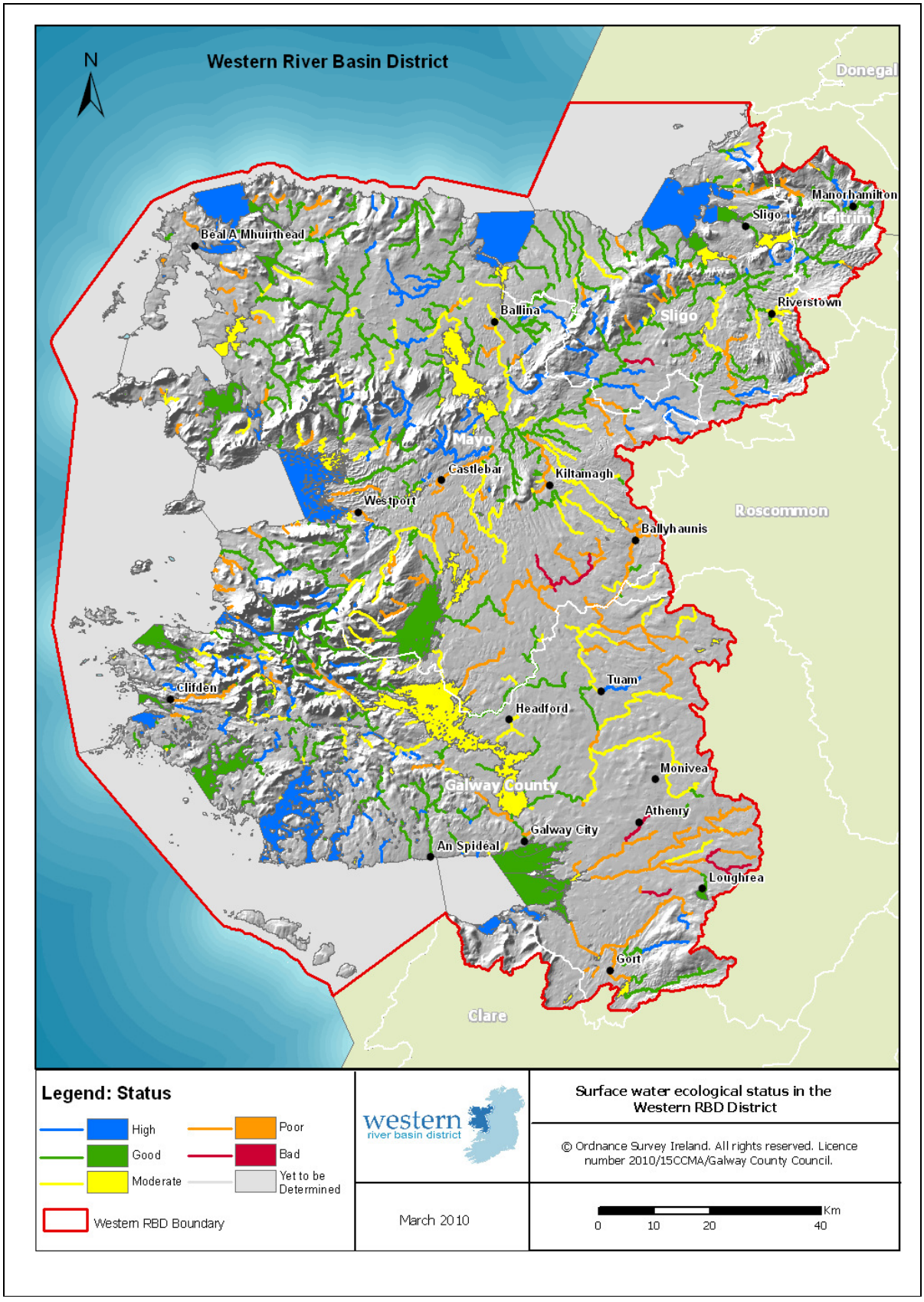
Overall ecological status is determined by the poorest scoring element assessed in the water body.

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 Western RBD

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 Western RBD based on all three combined factors is summarised in Table 3.2.

Table 3.2 Surface Water Ecological Status/potential in the Western District

Surface water Category	River and canals number (% of total) length km (% of total)	Lakes and reservoirs number (% of total) area km^2 (% of total)	Estuaries number (% of total) area km^2 (% of total)	Coastal number (% of total) area km^2 (% of total)
High	185 (19.2%) 532 (14.7%)	188 (58.6%) 35.8 (7.7%)	7 (10.3%) 33.3 (19.0%)	13 (43.3%) 441.2 (9.6%)
Good	454 (47.2%) 1,622 (44.7%)	77 (24.0%) 147.7 (31.7%)	12 (17.7%) 52.2 (29.7%)	6 (20.0%) 191.7 (4.2%)
Moderate	152 (15.8%) 689 (19.0%)	53 (16.5%) 279.5 (60.17%)	7 (10.3%) 2.3 (1.3%)	0 0
Poor	162 (16.8%) 724 (19.9%)	2 (0.6%) 2.12 (0.5)	0 0	0 0
Bad	10 (1.0%) 61 (1.7 %)	0.0 (0.0%) 0.0 (0.0%))	0 0	0 0
Yet to be determined	0 (0%) 0 ((0%)	1 (0.3%) 0.1 (0.01%)	42 (61.7%) 87.5 (50%)	11 (36.7%) 3941.6 (86.2%)

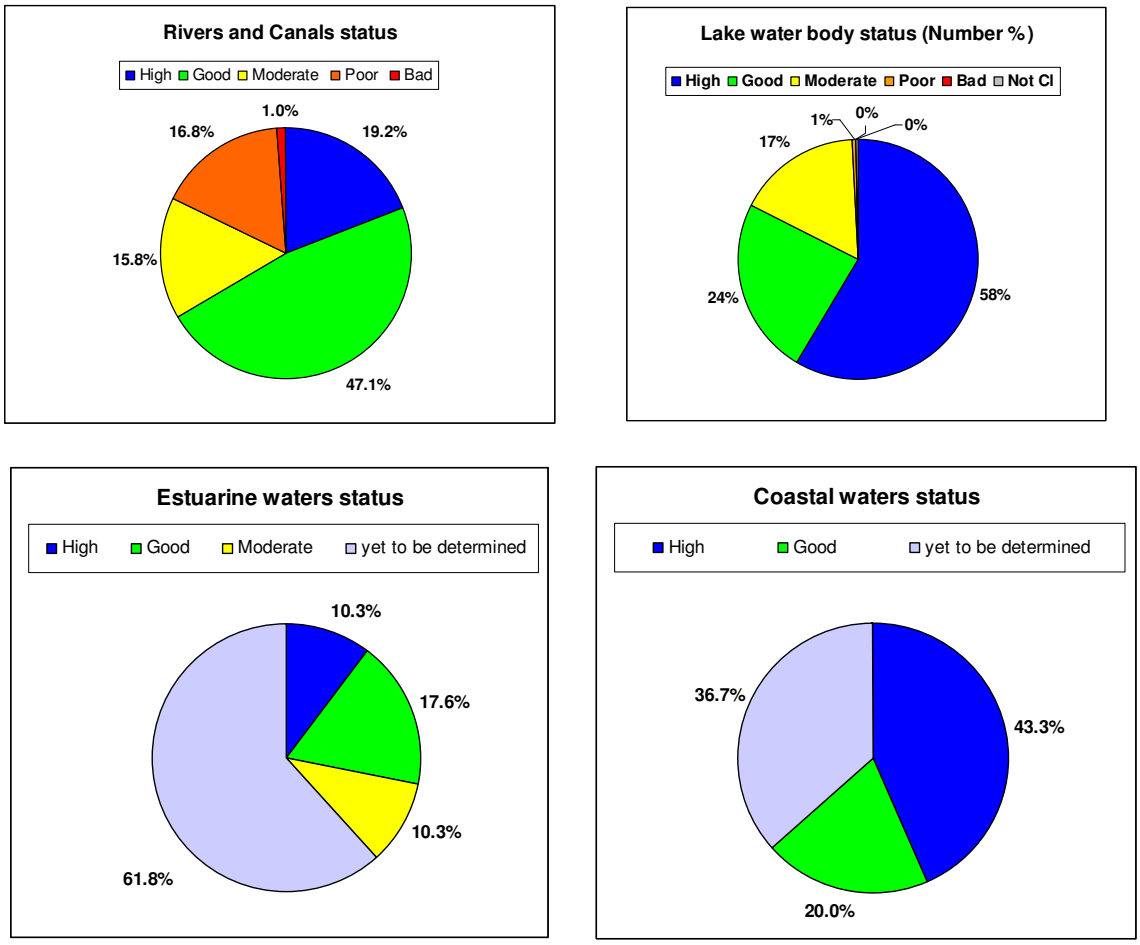


Figure 3.1 Ecological status of surface waters in the Western RBD

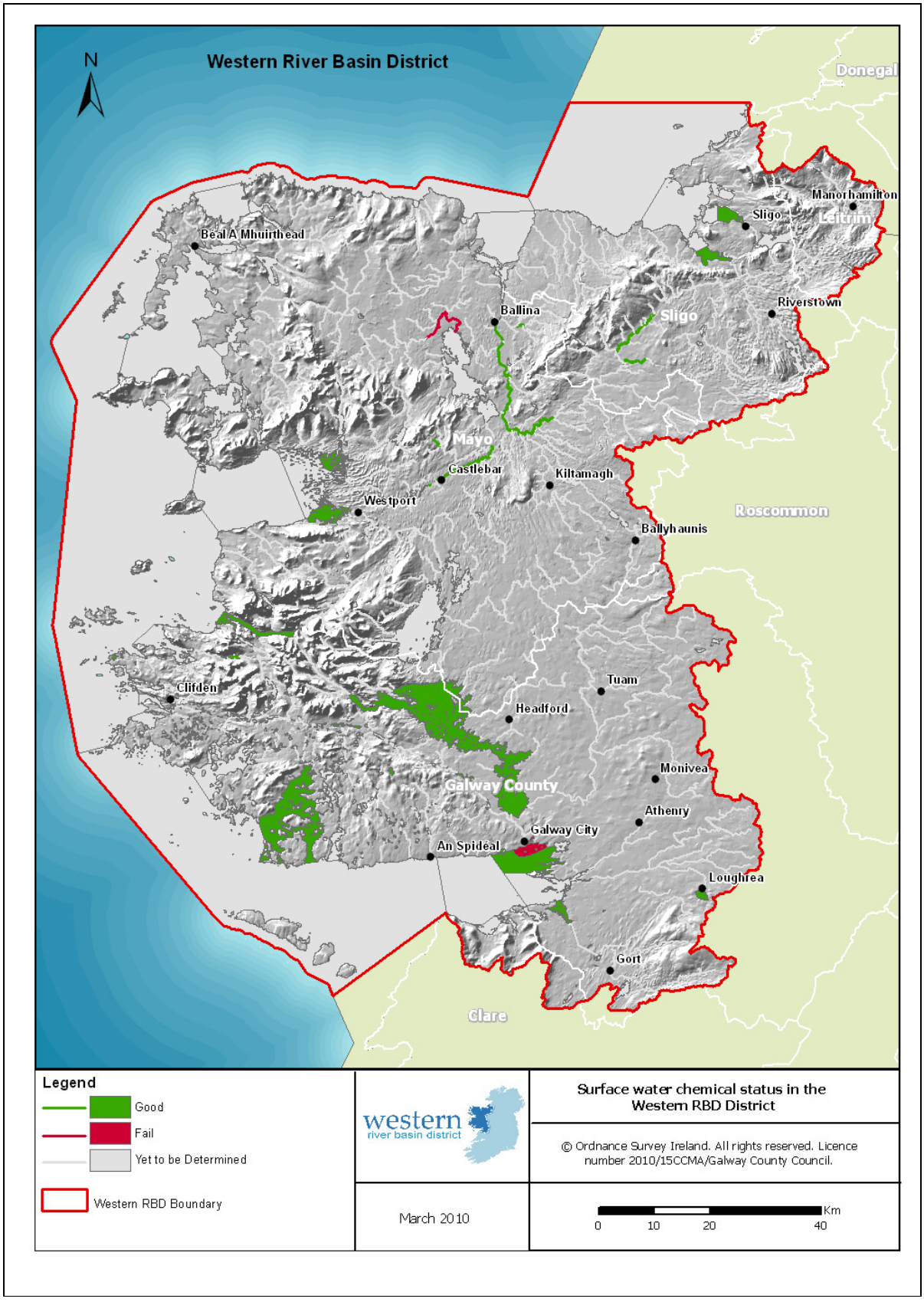
3.2.2 Surface water chemical status

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

One river, the Deel below Crossmolina to the Lough Conn, out of 9 sites monitored to date in the Western RBD 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. One estuary, the Corrib estuary has also failed chemical status (due to exceedance of standard for Brominated diphenylether (BDE) – a fire retardant).

Table 3.3 Surface water chemical status in the Western District

Surface water Category	River and canals number (% of total monitored) length km (% of total monitored)	Lakes and reservoirs number (% of total monitored) area km2 (% of total monitored)	Estuaries number (% of total monitored) area km2 (% of total monitored)	Coastal number (% of total monitored) area km2 (% of total monitored)
Good	8 (89.2%) 7.2 (84.7%)	11 (100%) 175.2 (100%)	5 (83.3%) 47.9 (83.2%)	3 (100%) 132.6 (100%
Fail	1 (11%) 14 (15.3%)	0 0	1 (16.7%) 9.7 (16.8%)	0 0



Map 3.3 Surface water chemical status in the Western RBD

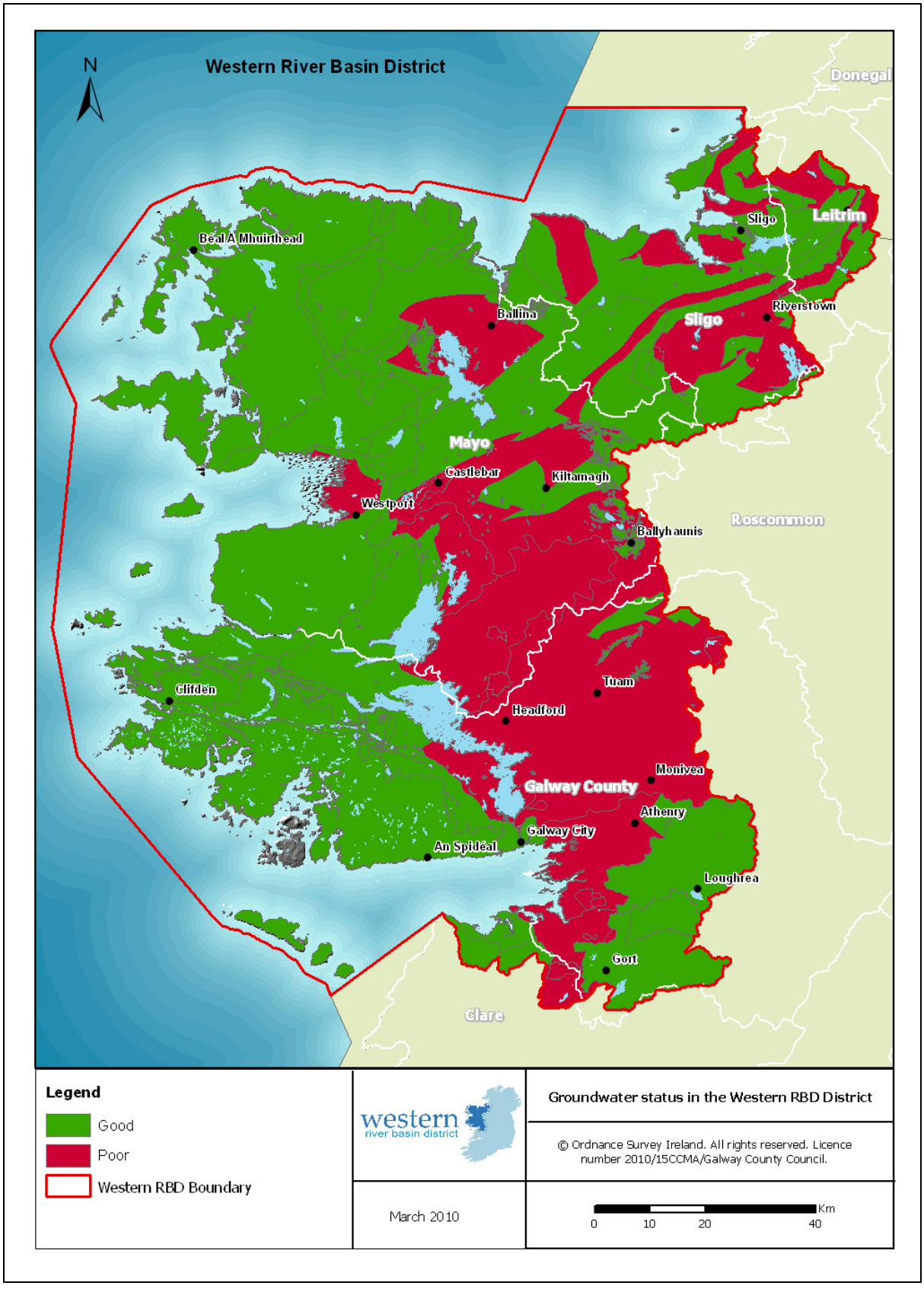
3.3 Groundwater

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.

The number and location of monitoring points is influenced by the hydrogeological characteristics of the Western RBD. Twenty seven (27) groundwater quality and twelve (12) groundwater level monitoring points are located in areas underlain by productive bedrock (43% of district comprising Karstic and Productive fissured bedrock) and sand/gravel aquifers (1% of the district). Four groundwater quality monitoring points are located in areas of poorly productive rocks, which underlie 56% of the district, and which are characterised by high surface runoff, low bedrock transmissivity and storage properties, low well yields, small localised underground flow systems and occasional narrow high transmissivity zones. Consequently, achieving a representative network in these rocks is problematical.

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 then a body or a group of bodies of groundwater is classified as being at poor chemical status.



Map 3.4: Groundwater status in the Western River Basin District

Table 3.4 Groundwater status in the Western District

Groundwater	Chemical Status Number (% of total) Area km^2 (% of total)	Quantitative Status Number (% of total) Area km^2 (% of total)	Combined status Number (% of total) Area km^2 (% of total)
Good	71 (67.6%) 7,649 (65%)	105 (100%) 11,732 (100%)	71 (68%) 7,649 (65%)
Poor	34 (32%) 4,083 (35%)	0% 0%	34 (32%) 4,083 (35%)

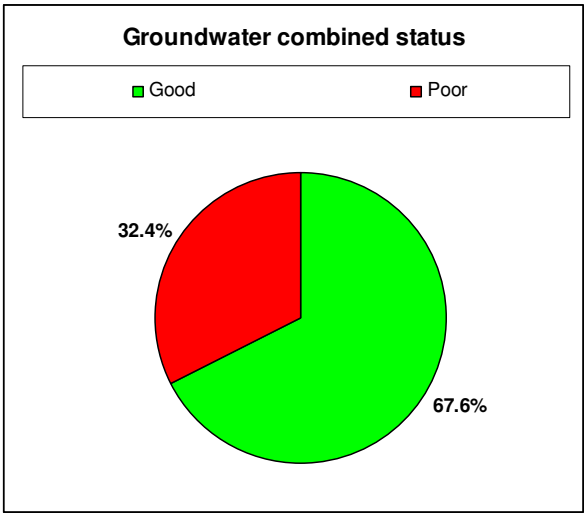


Figure 3.2 Combined status of groundwater in the Western RBD

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).

This is the case for three of the four designated freshwater pearl mussel populations in the Western RBD. These did not meet their protected area objectives due to water quality conditions and therefore status has been downgraded. The catchments do not achieve favorable 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:

- Dawros (Co. Galway) – evidence suggest that the quality of the population's habitat is failing due to siltation and nutrient enrichment. The population demographic profile, suggests that there are insufficient numbers of juveniles present to provide sustainable replacement of the current adult numbers. Status was downgraded in one river water body.
- Newport (Co. Mayo) - the quality of the population's habitat is failing through siltation, and its population demographic profile, where it is evident that 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
- Owenriff (Co. Galway) - this river flows into Lough Corrib through Oughterard. Surveys show that adult mussels remain in relatively intact numbers in the best habitats of the Owenriff, while losses are still occurring in the poorer habitats. However, juvenile numbers are much lower than those considered to be sustainable. Status was downgraded in three river water bodies.

One freshwater pearl mussel population is at favourable status:

- Bundorrogha (Co. Mayo) – the river system flows into Killary Harbour and the population is presently meeting its protected area status. The Freshwater Pearl mussel population is currently at Favourable Conservation Status following the 2009 survey in the Bundorragha. This improvement in status, since the previous survey, is primarily attributable to reduction in siltation and macrophyte abundance on the Bundorragha River. It has very large populations of adults, all ages of juveniles, and some juveniles in more than one area.

4 The objectives for the Western District

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 Western RBD.

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 Western RBD. 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

Table 4.1 Water bodies currently at high or good status

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 (%)	Groundwater Number (%) Area km^2 (%)
High or good	639 (66.3%) 2,154 (59.4%)	265 (82.3%) 183.6 (39.4%)	19 (27.9%) 85.5 (48.7%)	19 (63.3%) 633 (13.8%)	71 (68%) 7,649 (65.2%)

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 Western RBD show that 324 rivers and canals, 56 lakes and reservoirs and 7 estuaries are currently below good status and require restoration to good status. No coastal waters are currently classed as Moderate or less.

Table 4.2 Water bodies currently at less than good 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	324 (33.7%) 1,475 (40.7%)	56 (17.4%) 283 (60.6%)	7 (10.3%) 2.3 (1.3%)	0 (0%) 0 (0%)	34 (32%) 4,083 (34.8%)

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 Deel a tributary of the Moy, out of 9 sites monitored in the Western RBD is failing chemical status, one estuary, the Corrib estuary, out of 6 monitored is also failing chemical status; 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 (8%) 14 (15%)	0 (0%) 0 (0%)	1 (16.7%) 9.7 (16.8)	0 (0%) 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 Western RBD amongst the most sensitive of these protected sites are three 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 (Owenriff and Dawros rivers in County Galway and the Newport River in County Mayo).

Table 4.4 Water bodies associated with protected areas

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 (%)
Waters supporting protected areas	702 (72%) 2,949 (81%)	292 (90.7%) 452.9 (97.1%)	62 (91.2%) 119 (89.1%)	30 (100%) 4574 (100%)

4.2 Alternative objectives

In establishing objectives account has been taken of:

- technical, economic, environmental or recovery constraints. In these cases alternative timescales may be set for the waters in question;
- the nature and uses of certain artificial or heavily modified waters for which alternative objectives may be set to account for their sustainable use;
- new physical modifications and sustainable developments. Again alternative objectives may be set to cater for these 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 Western RBD 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.

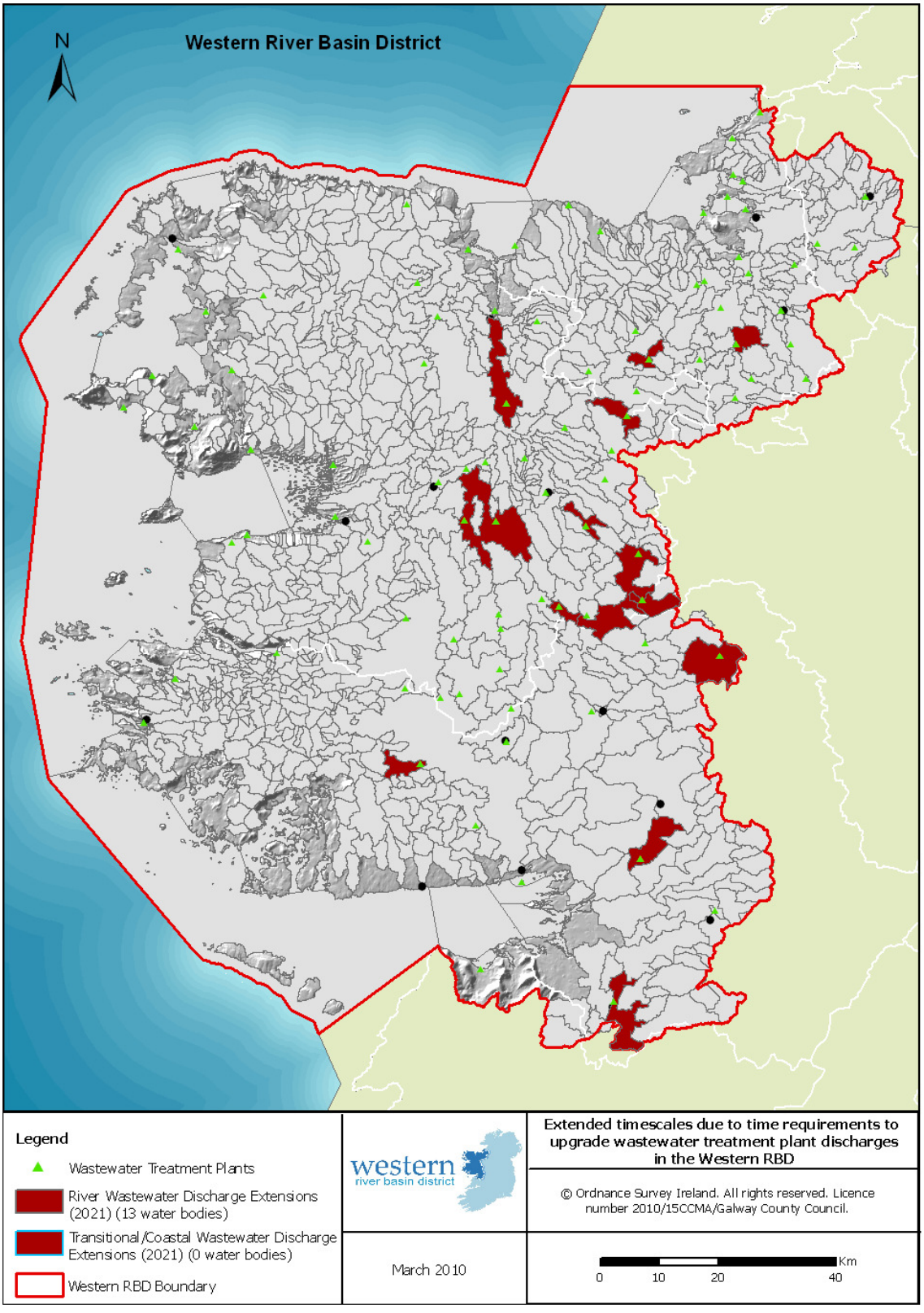
Table 4.5 Reasons why extended timescales are required in certain water bodies in the Western RBD

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	13	0	0	0	0	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	0	0	0	0	0	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 proposes 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	0	0	0	0	0	Nitrogen levels in groundwaters	Physical recovery: research has found that, even with full implementation of the Good Agricultural Practice regulations (Fenton, *et al,* 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 *objectives background documents*.	EPA to monitor status and trends under WFD programmes. Local authorities to review objectives if necessary.

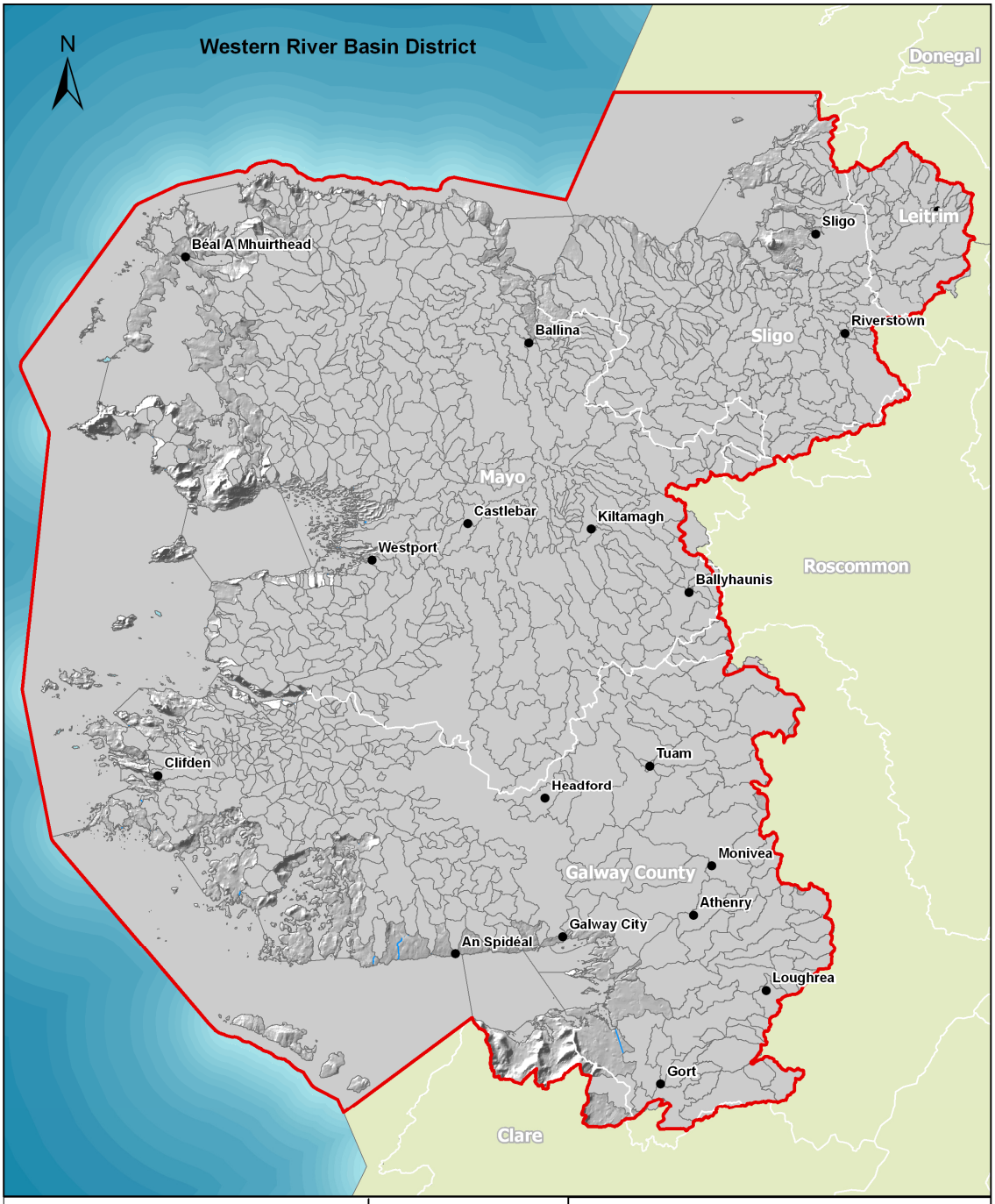
Issue and extension required	Rivers	Lakes	Transitional	Coastal	Groundwater	Likely failing status element	Constraint	Action to 2015
Agriculture: phosphorus losses to surface waters by runoff Extend to 2021 Map 4.3	4	1	0	0	0	Phosphorus levels supporting ecological status	Physical recovery: research (Schulte, *et al,* 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	144	14	0	0	34	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-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	1	0	0	0	0	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	1	0	1	0	0	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	EPA to monitor waters and establish a register of discharges, emissions and losses. Local Authorities to prepare pollution reduction programmes. In accordance

Issue and extension required	Rivers	Lakes	Transitional	Coastal	Groundwater	Likely failing status element	Constraint	Action to 2015
Extend to 2021 Map 4.5							technical constraint and objectives will need review in 2015.	with the Surface Waters Environmental Objectives Regulations 2009.
Physical modifications: channelisation risks Extend to 2021 Map 4.6	8	0	0	0	0	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
Physical damage due to overgrazing Extend to 2021 Map 4.6	24	0	0	0	0	Fish and invertebrates (where there is a problem of siltation on a river bed)	Physical recovery: overgrazing pressures have been addressed by commonage de-stocking programmes in certain catchments. In some cases physical damage to rivers (for example bank erosion) will not recover naturally and may require physical enhancement works. Site-specific studies are needed to investigate, and if appropriate design and cost river enhancement works. However, physical recovery and recovery of fish populations take from 3 to15 years after river enhancement, so objectives may need review in 2015.	EPA and Fisheries Boards to monitor catchments at risk from overgrazing; DAFF to monitor stocking rates. EPA proposes to co-ordinate environmental research to address knowledge gaps in relation to these sites.
Nitrogen losses to estuaries Extend to 2021 Map 4.7	0	0	1	0	0	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, *et al.* in press]. These groundwaters may	EPA and local authorities to monitor and review objectives under WFD programmes Review outcomes of ACPs and NAP

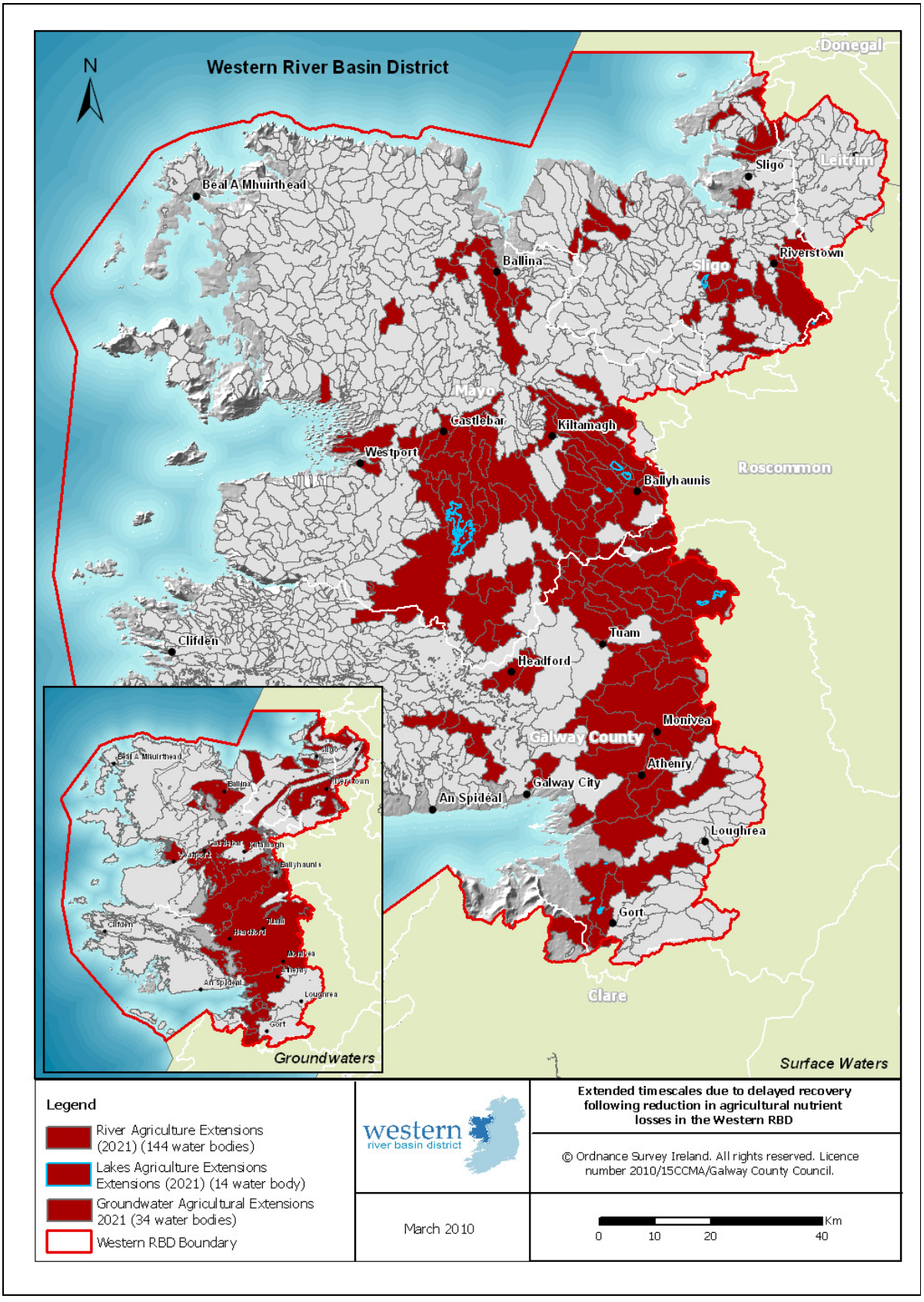
Issue and extension required	Rivers	Lakes	Transitional	Coastal	Groundwater	Likely failing status element	Constraint	Action to 2015
							be contributing significant nitrogen loads to river catchments which discharge to the estuaries. This poses a technical constraint as the source of the problem has 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.	
Delayed recovery of highly impacted sites Extend to 2021 Map 4.8	73	2	0	0	0	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	247	16	1	0	34			
Total as % of all waters	26%	5%	1%	0%	32%			



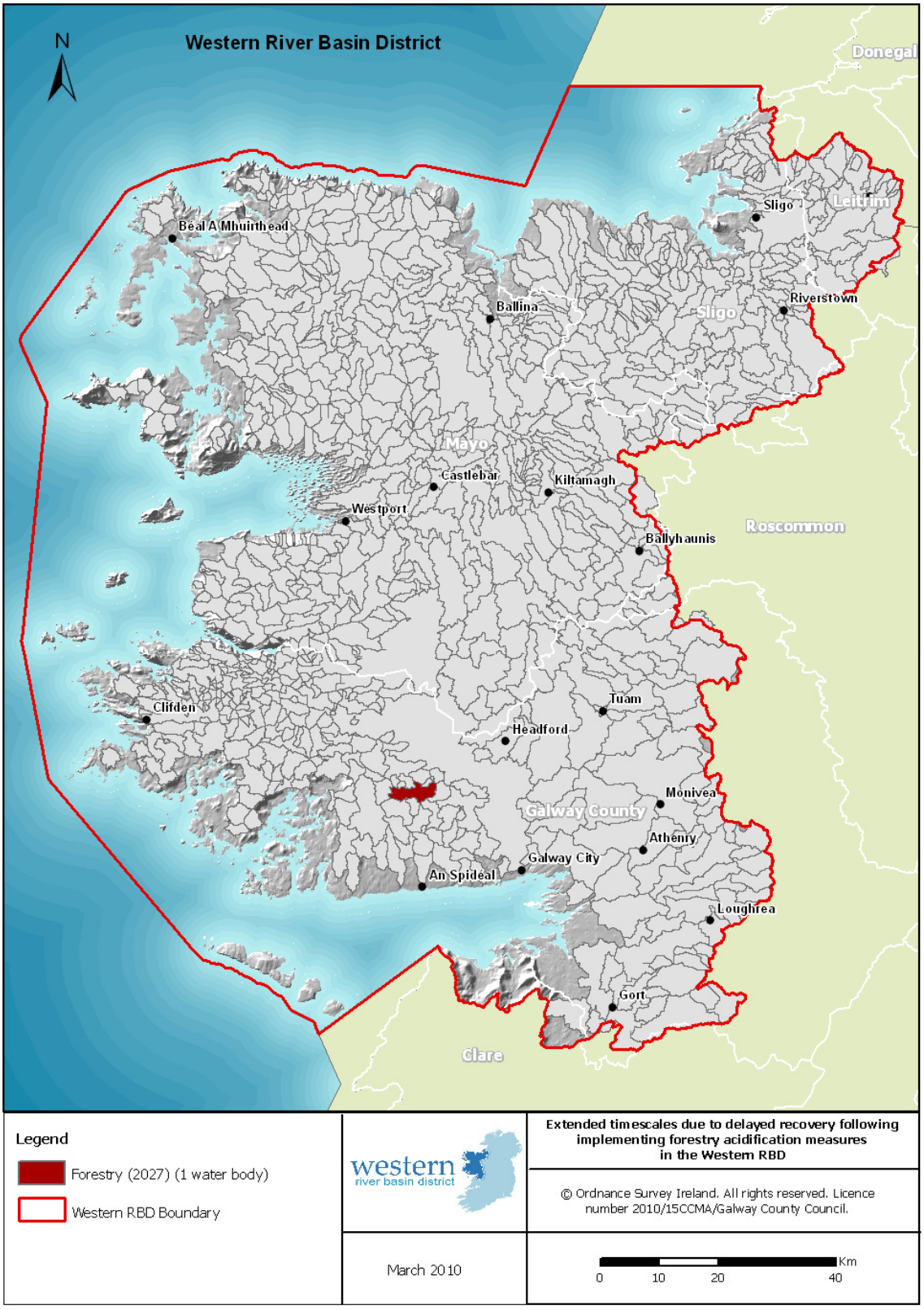
Map 4.1 Extended timescales for wastewater discharges from some treatment plants in the Western RBD



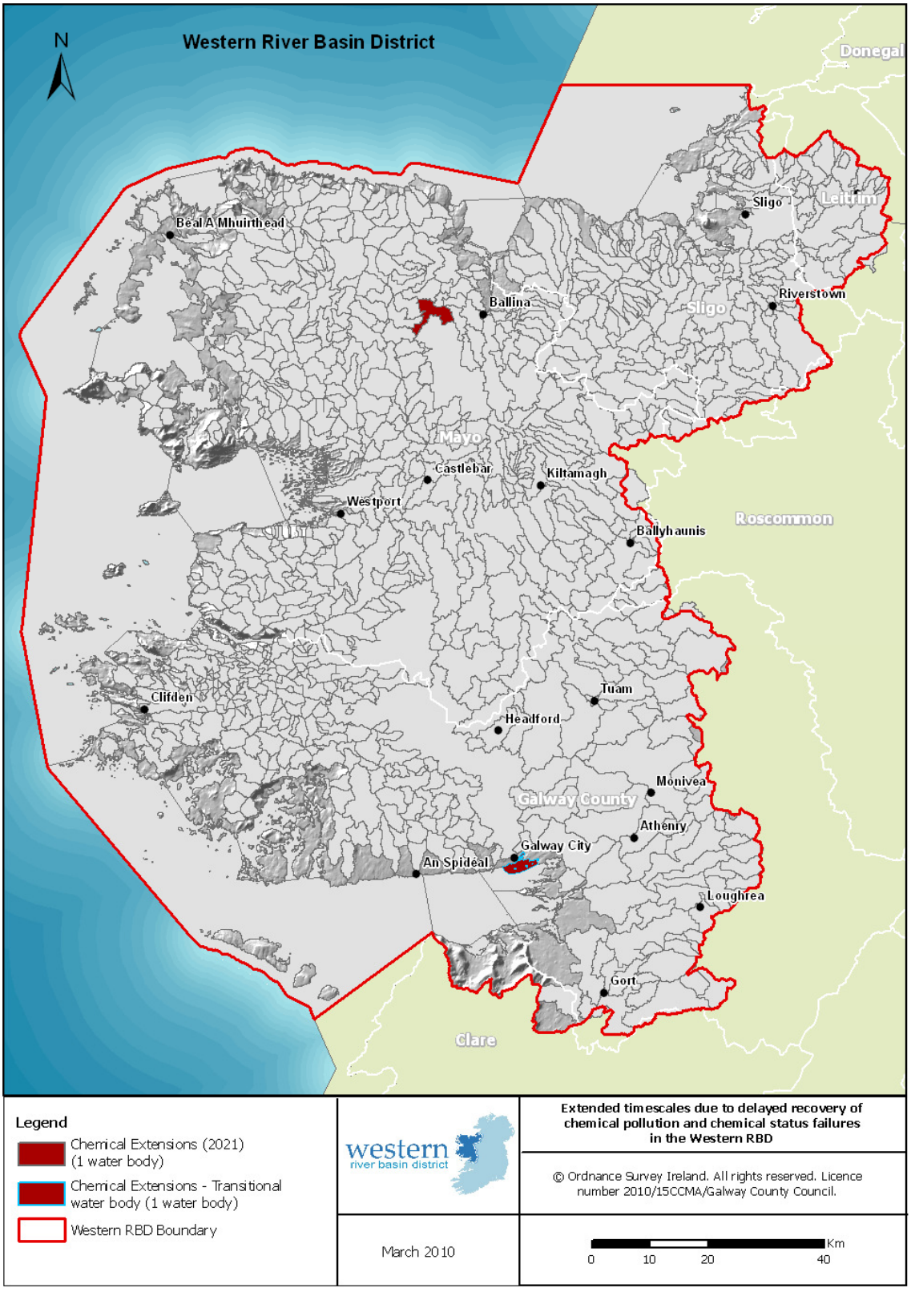
Map 4.2 Extended timescales for mines and contaminated sites in the Western RBD



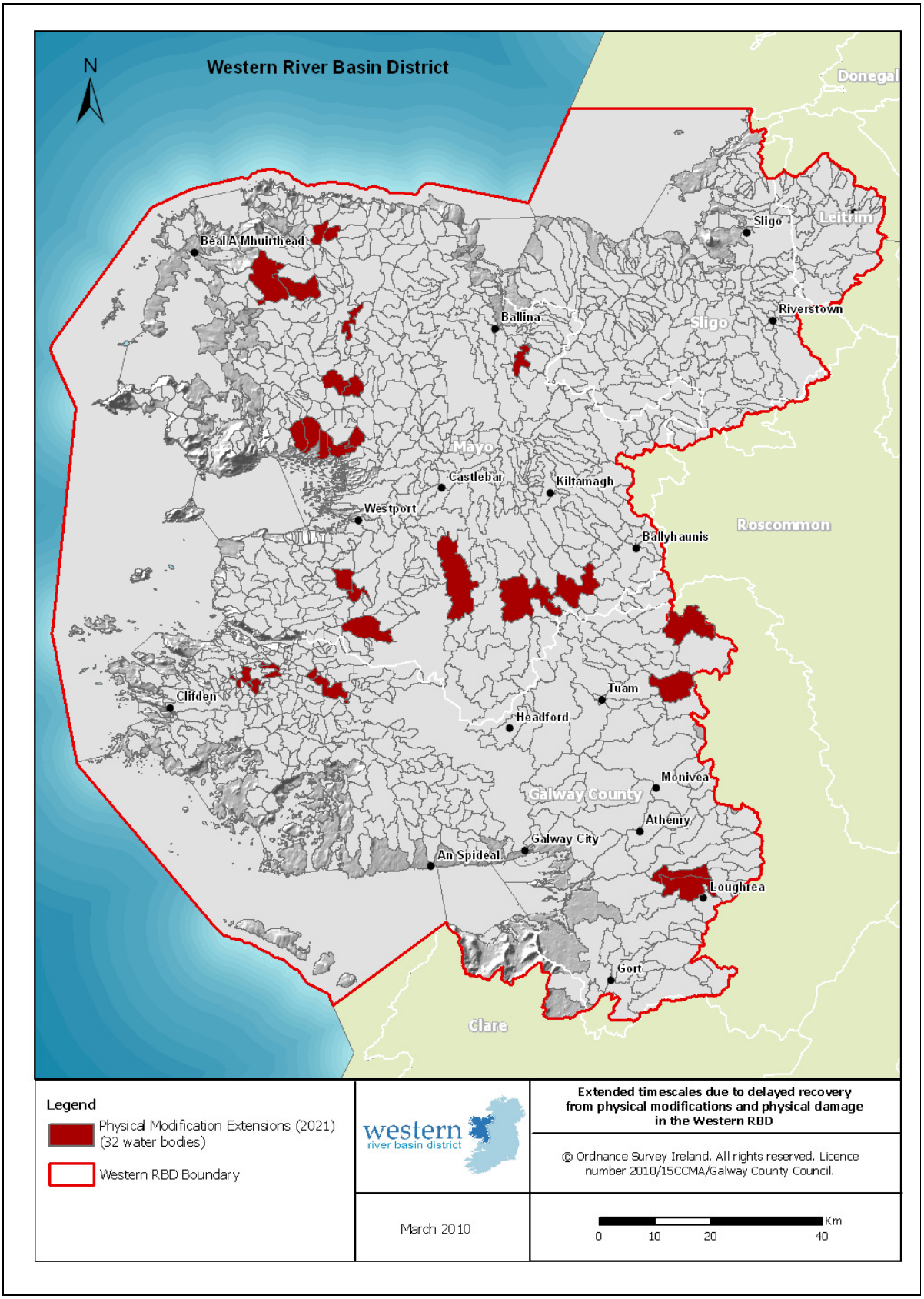
Map 4.3 Extended timescales for agricultural nutrient losses in the Western RBD



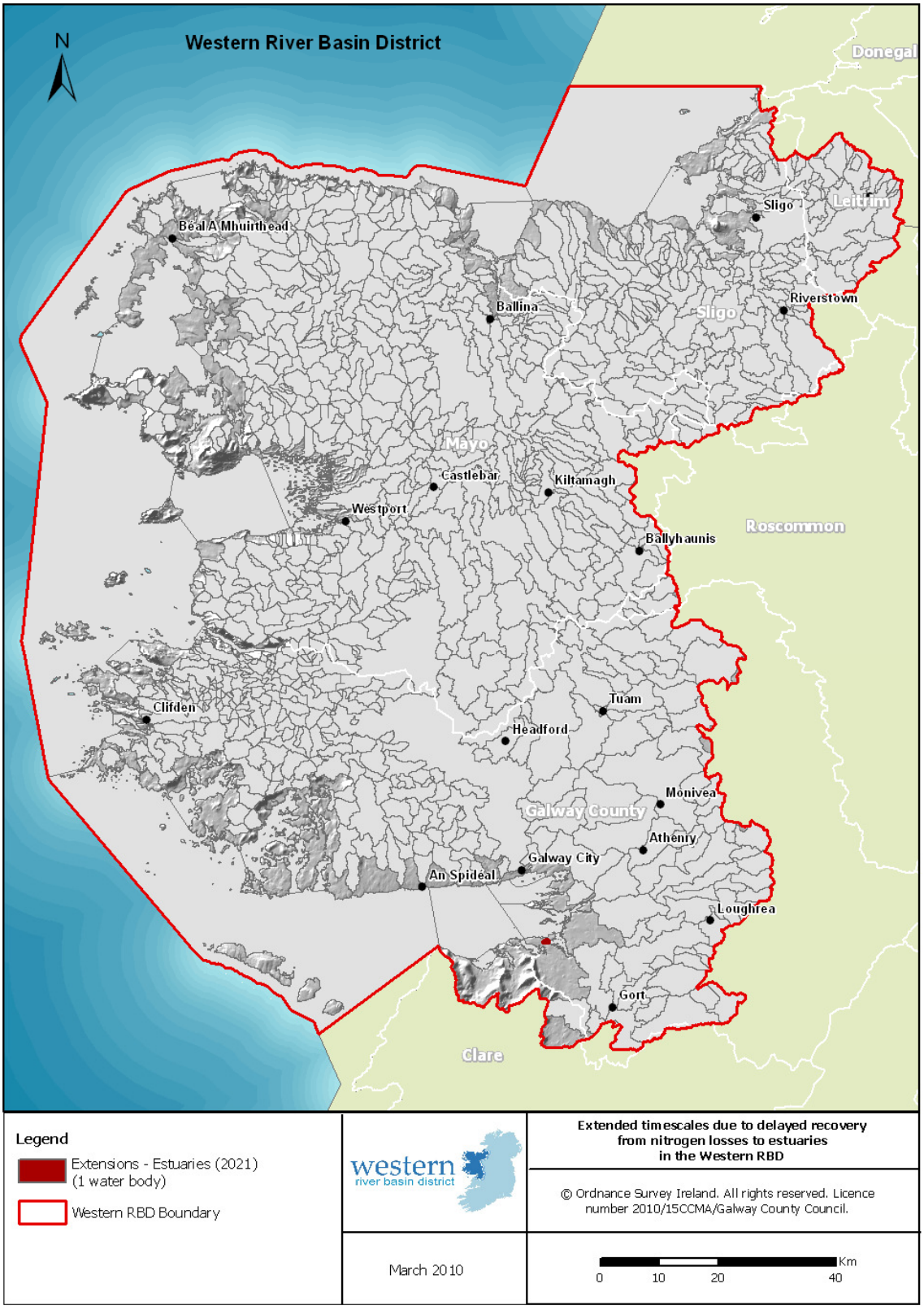
Map 4.4 Extended timescales for forestry in the Western RBD



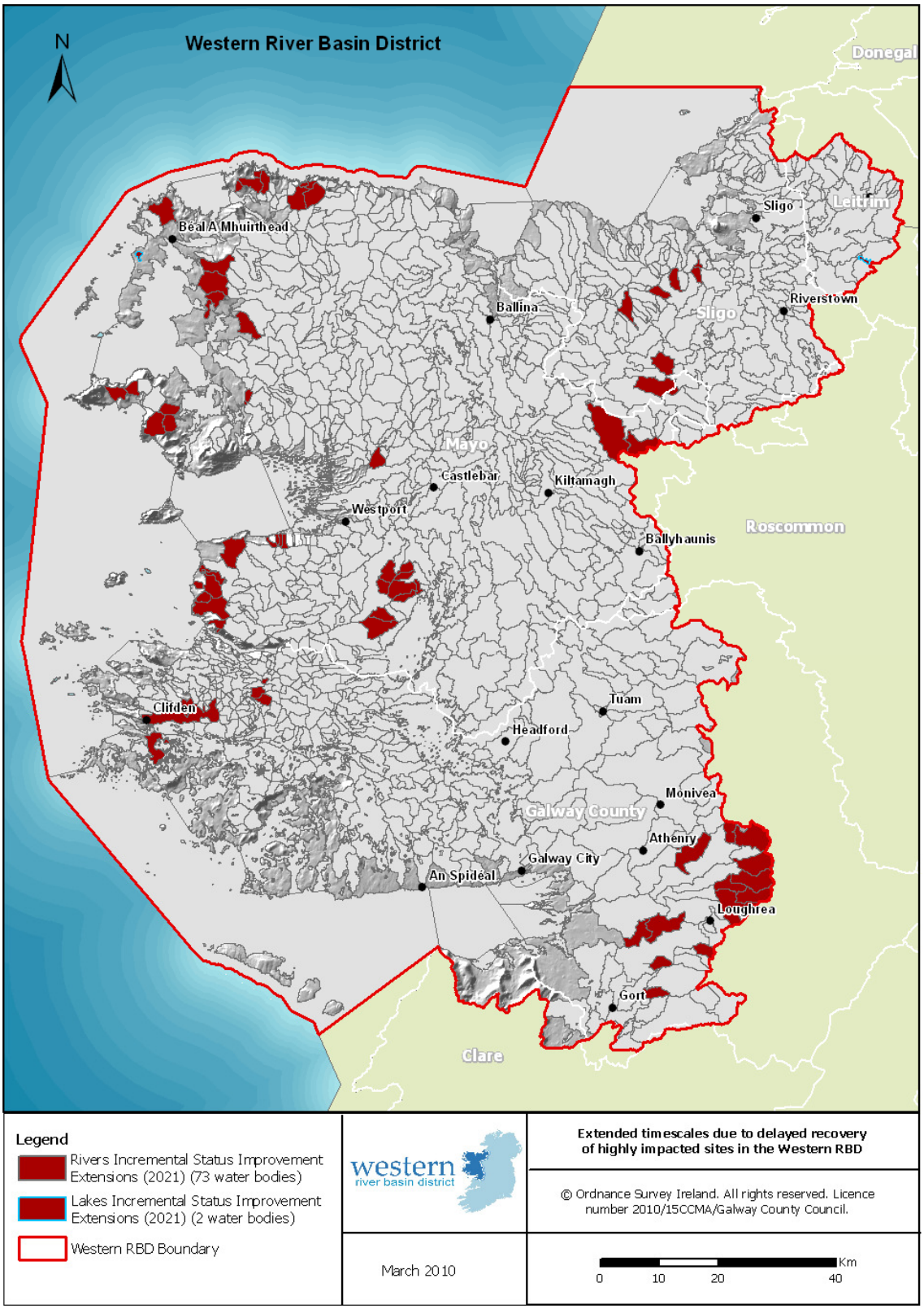
Map 4.5 Extended timescales for chemical status failures in the Western RBD



Map 4.6 Extended timescales for physical modifications in the Western RBD



Map 4.7 Extended timescales for nitrogen losses to Estuaries in the Western RBD



Map 4.8 Extended timescales for delayed recovery of highly impacted sites in the Western RBD

4.2.2 Heavily Modified and artificial water bodies

Some surface waters have been substantially changed in character or have been artificially constructed for uses such as navigation, water storage, public supply, flood defense and land drainage. Two such waters have been designated as artificial waters in the Western RBD. There are no designated heavily modified waters in the basin.

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
• Eglington canal • Cong canal	• Study to investigate good ecological potential • None: at good ecological potential

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	2 (0.2%) 3 (0.08%)	0 (0%) 0 (0%)	0 (0%) 0 (0%)	0 (0%) 0 (0%)
• Heavily modified waters	0 (0%) 0 (0%)	0 (0%) 0 (0%)	0 (0%) 0 (0%)	0 (0%) 0 (0%)
• Total as % of all waters	0.02%	0%	0%	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 proposed Conn (Crossmolina) and Dunkellin river Flood Relief Schemes are new physical modifications in the Western RBD, which may require alternative objectives to be determined by a detailed assessment if the scheme progresses.

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, for example, include impoundment of Lough Cutra near Gort as a source of regional water supply, development of Galway Port or specific road projects by the National Roads Authority through the Transport 21 initiative and National Road Development Strategy and future flood relief schemes.

Table 4.7 Waters where there will be new modifications or developments

Type	Rivers and canals Number (%)	Lakes and reservoirs Number (%)	Estuaries Number (%)	Coastal Number (%)
Total as % of all waters	1 (0.1%)	1 (0.3%)	0 (0%)	0 (0%)

4.3 The full picture

Table 4.8 shows target timescales for improvement of the Western RBD's waters over the plan'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 status.

Table 4.8 Timescale for achieving surface water and groundwater objectives

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	637 (66.1%) 2,137 (58.5%)	265 (82.3%) 183.6 (39.4%)	18 (26.5%) 75.8 (56.9%)	19 (63.3%)* 632.9 (13.8%)*	71 (67.6%) 7,649 (65.2%)
2015	716 (74.3%) 2,324 (63.6%)	305 (95.1%) 441.6 (94.4%)	24 (35.3%) 121 (90.9%)	19 (63.3%)* 632.9 (13.8%)*	76 (72.4%) 7,7201 (65.8%)
2021	962 (99.9%) 3,622 (99.4%)	321 (99.7%)* 466.4 (99.7%)*	26 (38.2%)* 130.7 (90.9%)*	19 (63.3%)* 632.9 (13.8%)*	105 (100%) 11,731 (100%)
2027	963 (100%) 3,629 (100%)	321 (99.7%)* 466.4 (99.7%)*	26 (38.2%)* 130.7 (90.9%)*	19 (63.3%)* 632.9 (13.8%)*	105 (100%) 11,731 (100%)

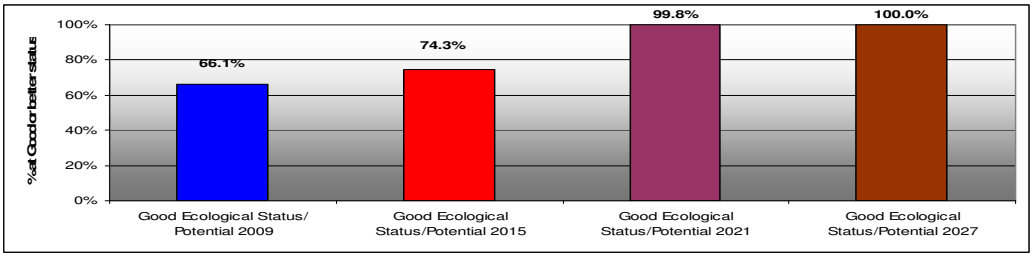
It is estimated that implementing the measures in this plan will achieve good status by 2015 in 716 rivers and canals, 305 lakes and reservoirs, 24 estuaries, 19 coastal waters and 76 groundwaters, with further improvements during the second and third planning cycles. Graphs 4.1 – 4.5 illustrate the 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.

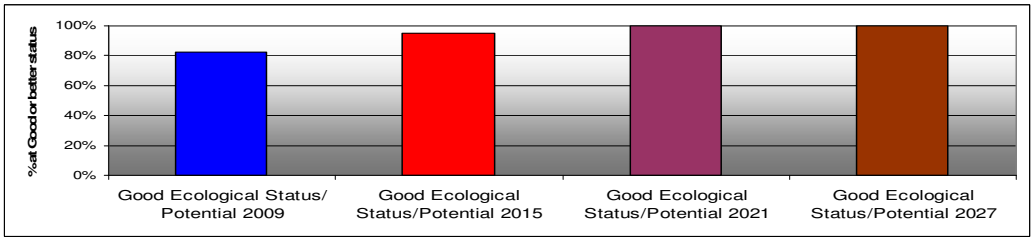
Between publication of the draft plan and finalisation of this plan a detailed assessment was made of the expected timescales for recovery of waters following implementation of measures. This assessment indicates that longer recovery timescales can be expected for a larger number of water bodies. In the draft plans 92% of rivers and canals, 100% of lakes and reservoirs, 100% of estuaries, 100% of coastal waters and 100% of groundwaters were expected to achieve good status by 2015. It is now expected that the good status will be achieved by 2015 in 74% of rivers and canals, 95% of lakes and reservoirs, 35% of estuaries, 63% of coastal waters and 72% 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.

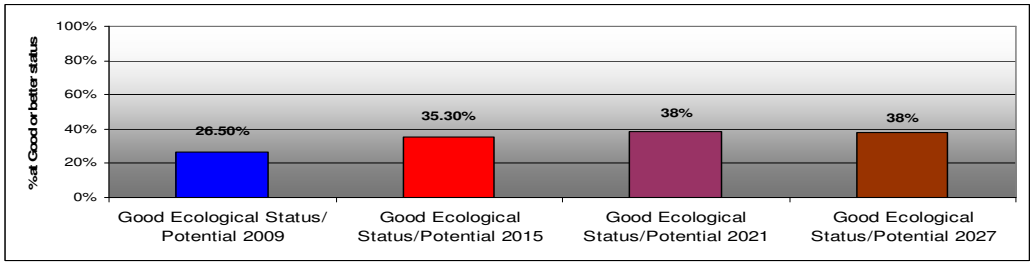
Graph 4.1 – Status trends over three planning cycles rivers and canals (number)



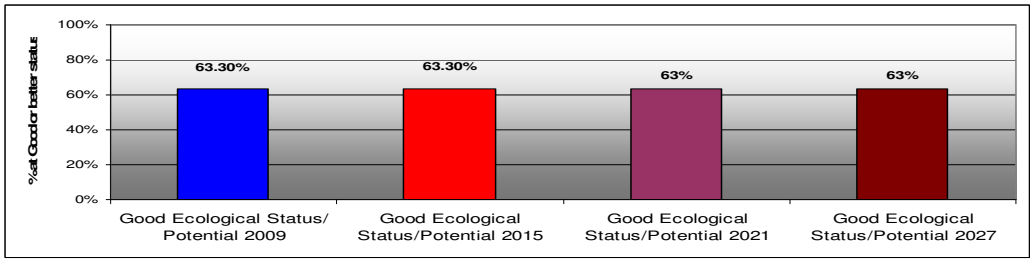
Graph 4.2 – Status trends over three planning cycles lakes and reservoirs (number



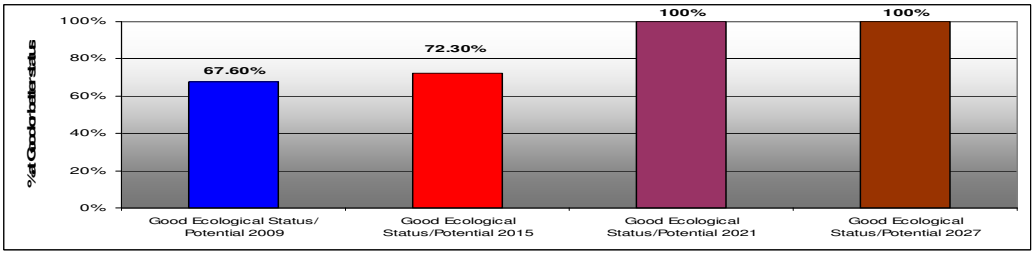
Graph 4.3 – Status trends over three planning cycles estuaries (number)

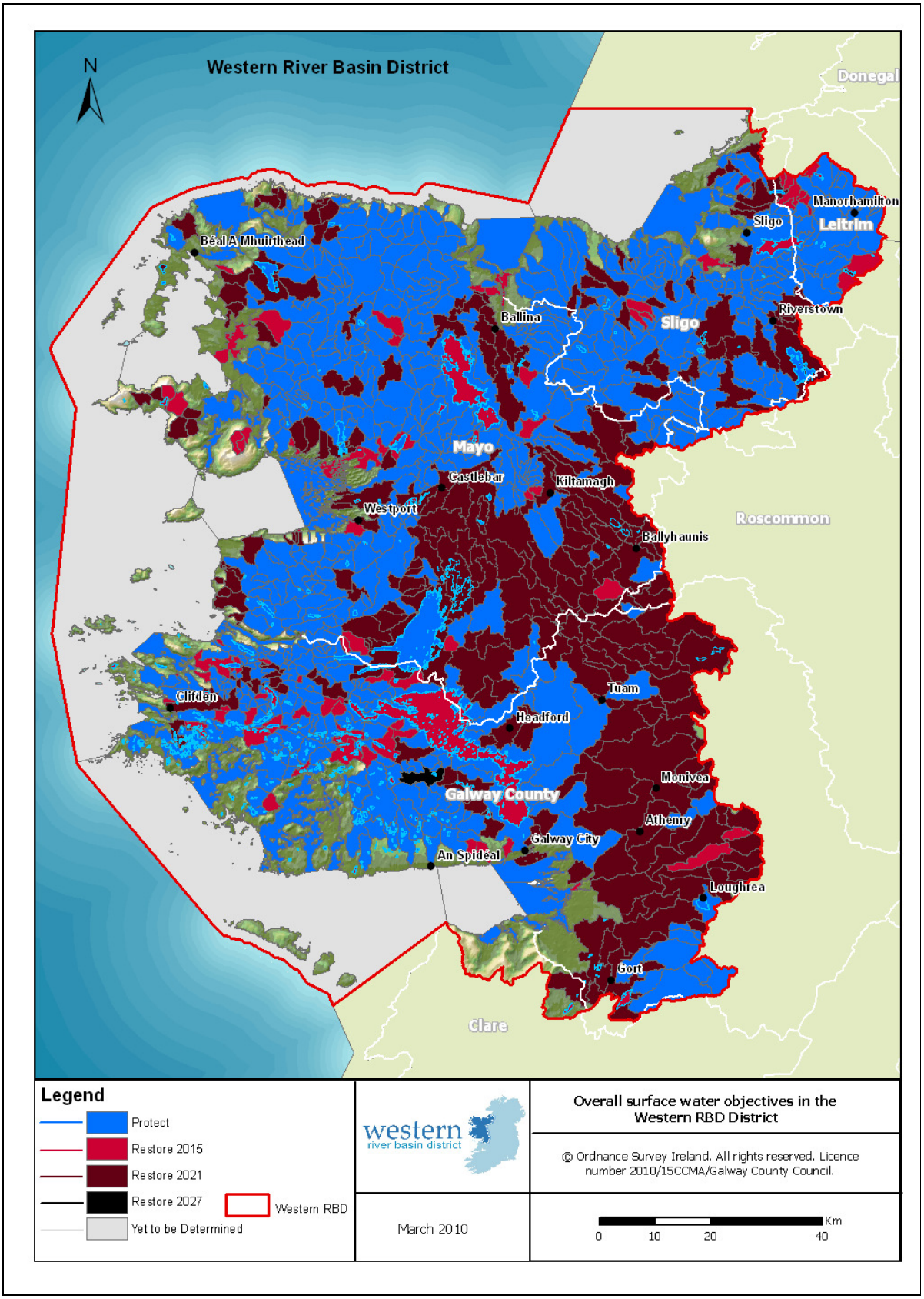


Graph 4.4 – Status trends over three planning cycles coastal waters (number)

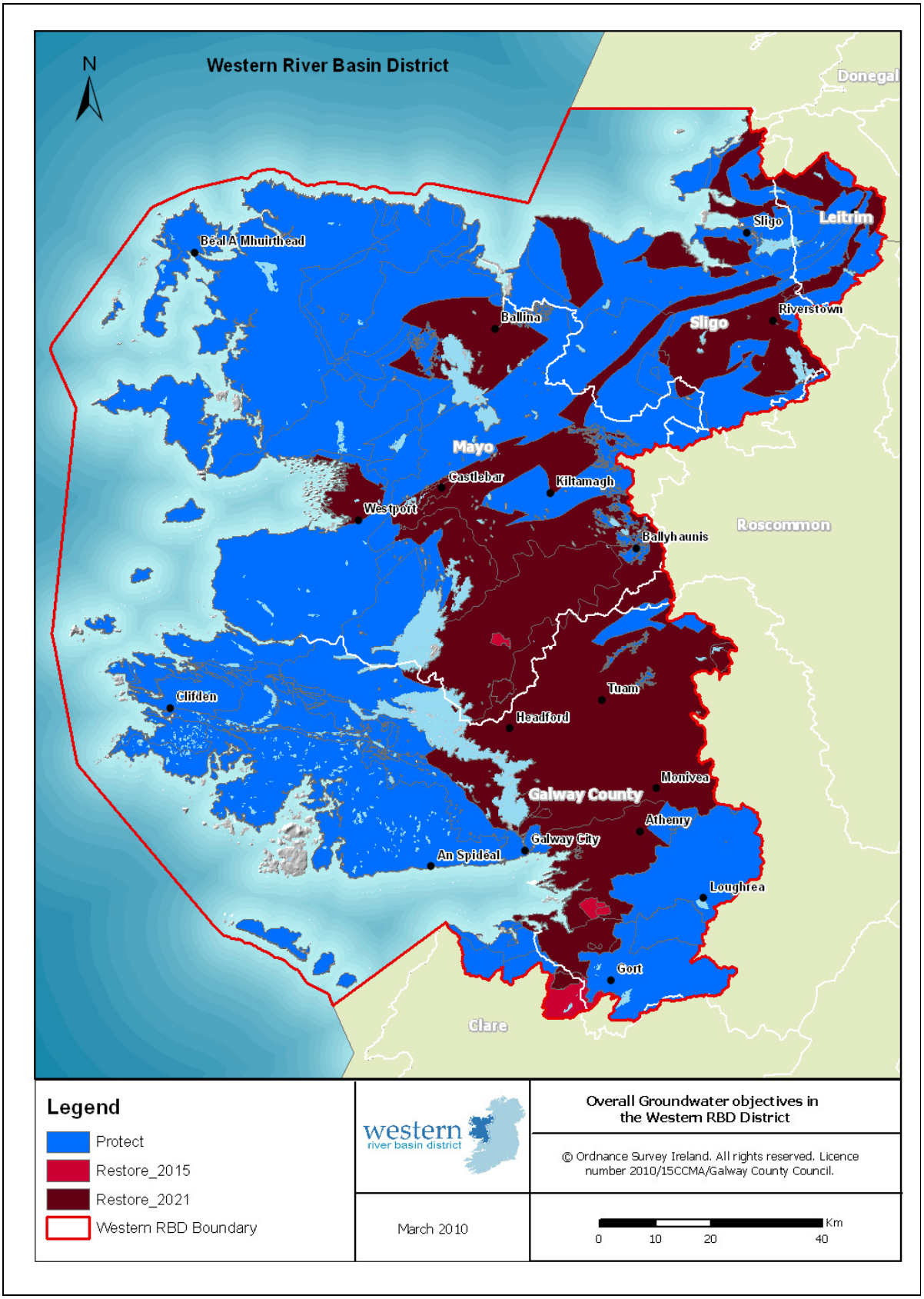


Graph 4.5 – Status trends over three planning cycles groundwaters (number)





Map 4.9 Overall surface waters objectives in the Western RBD



Map 4.10 Overall groundwaters objectives in the Western RBD

5 The programme of measures for the Western RBD

Chapter 4 set out the objectives for the Western RBD. 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 Western RBD 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.

- 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, 31 in the Western RBD.
- 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. Four sub-basins are located in the Western RBD.
- 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 494 of 2009) to designate an additional fifty shellfish waters. There are now a total of 64 shellfish waters nationally, 17 are located in the Western RBD.
- 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 (SI 48 of 2010) which designate an additional 10 sites as Sensitive Areas. This brings the total number of sites designated nationally to 43 (one located in the Western RBD, the Castlebar River, County Mayo — downstream of the sewage treatment works at Knockthomas to entry into Lough Cullin)
- 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 Western RBD 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 one of the two most important sources of pollution in Irish rivers, accounting for 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. Although the focus to date has been on the provision of infrastructure, 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 is also an offence.

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 compliance with the requirements of licences/authorisations 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 Approach[1] 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 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 black spots;
- 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

[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.

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 to before the end of the first River Basin Management 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 implementation of 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. 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. 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). The ACP is working closely with farmers in six catchments nationally to monitor and evaluate the environmental and socio-economic effects of the NAP measures. One of these is located in the Western RBD. The catchments were selected to represent various typical agricultural enterprise types and typical environmental risks to groundwater and surface water. Two of these catchments contain a high proportion of tillage. One of these 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/agcatchments/).

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 WFD 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).

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, four of these are located in the Western RBD (Bundorragha, Dawros, Newport and Owenriff). Twenty six of the twenty-seven ntionally 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; seventeen are located in the Western RBD. Following consultations with the relevant public authorities all shellfish PRPs and Strategic Environmental Assessments (SEA) 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 identification of any non-compliance 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 (2007) 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 110,042 hectares of public and private forestry in the Western RBD. 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 does 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 ongoing[2] 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

[2]

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 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, involving monitoring 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.

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, 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 15mg $CaCO_3 1^{-1}$(calcium carbonate).
- Where the minimum alkalinity of the run-off water is in the range 8-15mg $CaCO_3 1^{-1}$, 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 8mg $CaCO_3 1^{-1}$.

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.
- 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: Eight rivers have been identified in the Western RBD where channelisation measures are required. Further monitoring is required in order to identify where ecological status has been impacted by arterial drainage on other rivers in the RBD. Remediation measures may be required for these also.
- 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 Western RBD has been compiled for smaller, more manageable geographical areas than river basin districts, termed water management unit action plans. There are fourteen water management units (WMUs) in the Western RBD (Map 5.1). These units represent smaller river and lake basins where management of the pressures, investigations and measures will be focused and refined during implementation of this plan. In addition, action plans focusing on groundwater and transitional and coastal water management have been prepared for the Western RBD. The full set of detailed water management unit action plans 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 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 sources[3];
- 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.

[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.

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 Western RBD include:

- wastewater treatment plant discharge licensing, prioritised upgrade and operational improvement of some plants;
- licence review and enforcement regarding industrial activities and trade discharges;
- 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 four areas: Bundorragha, Dawros, Newport and Owenriff;
- implementing Shellfish Waters Pollution Reduction Programmes (available at www.environ.ie) for the following seventeen sites: Achill Sound North, Achill Sound South, Aughinish Bay, Ballinakill Harbour, Ballyvaughan/Poulnaclough Bay, Blacksod Bay, Clarinbridge/Kinvarra, Clew Bay, Clifden Bay, Ardbear Bay, Drumcliff Bay, Cill Chiarán Bay, Kilalla Bay, Killary Harbour, Mannin Bay, Outer Galway Bay – Indreabhán, Sligo Bay and Streamstown Bay;
- 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.

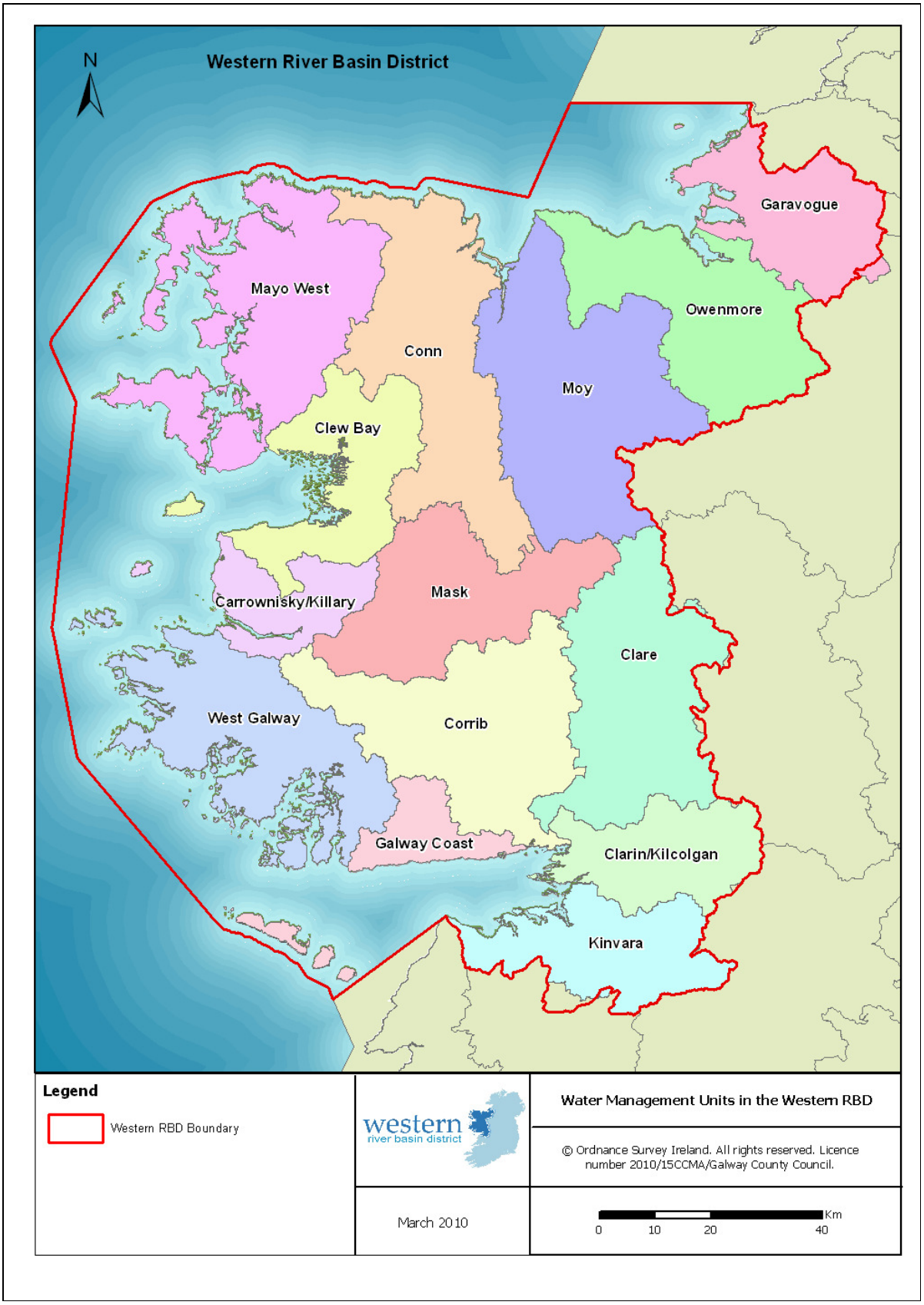
Economic assessment may be required in certain instances when selecting between alternative measures and when determining whether any particular measure should be applied. Guidance on economic assessment and a baseline report on the economic analysis of water use in Ireland are available as *economic background documents* on www.wfdireland.ie. The Environmental Protection Agency has 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 Western RBD 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 Western RBD

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

Table 5.1 Summary programme of measures for the Western RBD

	Water Management Units													
	Carrownisky/ Killary	**Clare River**	**Clarin/ Kilcolgan**	**Clew Bay**	**Conn**	**Corrib**	**Galway Coast**	**Garavogue**	**Kinvara**	**Mask**	**Mayo West**	**Moy**	**Owenmore**	**West Galway**
Control of urban waste water discharges														
Treatment plants requiring capital works	0	2	1	0	2	1	0	2	1	1	0	4	2	1
Treatment plants requiring further investigation	0	0	0	1	2	0	2	2	2	1	1	1	1	3
Treatment plants requiring attention to meet Shellfish water PRPs	0	0	0	0	0	0	0	4	1	0	0	0	0	1
Treatment plants requiring improvements in operational performance	0	0	2	3	4	2	0	0	1	2	2	4	3	0
Urban agglomerations requiring investigation of CSOs	0	2	1	0	2	0	0	1	1	1	0	2	2	0
Agglomerations that require management of development	0	0	1	2	1	2	0	2	1	1	0	1	3	0
Properties that will be subject to performance, operational and maintenance standards for on-site waste water treatment systems	Total: 964 At risk:0	Total: 14,056 At risk: 3,309	Total: 8,638 At risk: 2,890	Total: 5,038 At risk: 1,403	Total: 9,363 At risk: 1,147	Total: 11,021 At risk: 3,671	Total: 4,292 At risk: 509	Total: 6,436 At risk: 912	Total: 5,040 At risk: 0	Total: 7,149 At risk:1,090	Total: 6,035 At risk: 0	Total: 14,144 At risk: 555	Total: 8,186 At risk: 472	Total: 7,989 At risk: 138
Sub-basin plans for Natura 2000 sites designated for the protection of Freshwater pearl mussel populations	1	0	0	1	0	1	0	0	0	0	0	0	0	1
Pollution Reduction Programmes for designated shellfish waters	1	0	1	1	1	0	1	2	3	0	4	1	0	5
IPPC licences with discharges to waters that require review	0	1	5	1	4	3	0	5	1	4	2	1	2	0
Licences for discharges to waters under the Water Pollution Acts that require review	9	20	21	12	12	11	22	14	8	7	17	12	7	39
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 Western RBD. 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 Western District

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. For example, 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 Western RBD in accordance with national and EU legislation. Similarly an Appropriate Assessment (AA) for Natura 200 Sites was prepared to ascertain any impacts to Protected Areas. Statutory consultation about these assessments was undertaken with the relevant bodies in Ireland (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, e.g. flood defenses, 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 Western RBD 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 Western RBD 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 Western RBD to facilitate understanding of the Water Framework Directive, can be found at www.wfdireland.ie.

Contacts

- Western River Basin District competent authorities
- Western River Basin District Advisory Council 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

Western 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

Signficant Water Management Issues Report

Water Matters "*Have your say"* Western River Basin District Summary Leaflet not found Click here

Water Matters "*Have your say"* Western River Basin District Booklet Click here

Digest of submissions and responses to Significant Water Management Issues Reports, Western 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 "*Help Us Plan*!" Summary Leaflet Click here

Water Matters "*Help Us Plan*!" Draft River Basin Management Plan for the Western River Basin District Click here

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

Recommendations For Programmes of Measures for Point Source Discharges to Surface Waters Resulting from Municipal and Industrial Regulated Activities Click here

Forest and Water

- 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

Click here

On-site Wastewater Treatment Systems

- 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.

Click here

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

- Clare River Water Management Unit Action Plan
- Clarin Kilcolgan Water Management Unit Action Plan
- Clew Bay Water Management Unit Action Plan
- Conn Water Management Unit Action Plan
- Corrib Water Management Unit Action Plan
- Galway Coast Water Management Unit Action Plan
- Garravogue Water Management Unit Action Plan
- Carrownisky Killary Water Management Unit Action Plan
- Kinvara Water Management Unit Action Plan
- Owenmore Water Management unit
- Mask Water Management Unit Action Plan
- Mayo West Water Management Unit Action Plan
- Moy Water Management Unit Action Plan
- West Galway 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 Click here 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 - Western River Basin District Click here
Environmental Report Strategic Environmental Assessment for the Water Framework Directive River Basin Management Plans and Programmes of Measures - Western River Basin District Click here
Habitats Directive Article 6 Assessment Water Framework Directive River Basin Management Plans and Programmes of Measures - Western 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 Modelling phosphorus decline: expectations of the Water Framework Directive in Ireland Papers undergoing peer review – link to be added
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 Western River Basin District Click here

Western River Basin District Draft River Basin Management Plan Submissions Digest Report Click here

Compliance statement

Western River Basin District Compliance Report Click here

More Detailed Plans and Programmes

Freshwater Pearl Mussel Sub-basin Management Plans

- Freshwater Pearl Mussel – Bundorragha Sub-Basin Management Plan
- Freshwater Pearl Mussel - Dawros Sub-Basin Management Plan
- Freshwater Pearl Mussel – Newport Sub-Basin Management Plan
- Freshwater Pearl Mussel - Owenriff Sub-Basin Management Plan

Click here

Monitoring Methods Report Freshwater Pearl Mussel Sub-basin Plans Click here

Shellfish Pollution Reduction Programmes

- Achill Sound North Shellfish Pollution Reduction Programme
- Achill Sound North Shellfish Characterisation Report
- Achill Sound South Pollution Reduction Programme
- Achill Sound South Characterisation Report
- Aughinish Shellfish Pollution Reduction Programme
- Aughinish Characterisation Report
- Blacksod Bay Shellfish Pollution Reduction Programme
- Blacksod Bay Shellfish Characterisation Report
- Ballinakill Harbour Shellfish Pollution Reduction Programme
- Ballinakill Harbour Characterisation Report
- Ballyvaughan Poulnaclough Shellfish Pollution Reduction Programme
- Ballyvaughan Poulnaclough Characterisation Report
- Clarinbridge Kinvara Pollution Reduction Programme
- Clarinbridge Kinvara Characterisation Report
- Clew Bay Shellfish Pollution Reduction Programme

- Clew Bay Characterisation Report
- Clifden Bay Ardbear Bay Shellfish Pollution Reduction Programme
- Clifden Bay Ardbear Bay Characterisation Report
- Drumcliff Bay Shellfish Pollution Reduction Programme
- Drumcliff Bay Characterisation Report
- Cill Chiaráin Bay Pollution Reduction Programme
- Cill Chiaráin Bay Shellfish Characterisation Report
- Killala Bay Pollution Reduction Programme
- Killala Bay Characterisation Report
- Killary Harbour Shellfish Pollution Reduction Programme
- Killary Harbour Characterisation Report
- Mannin Bay Shellfish Pollution Reduction Programme
- Mannin Bay Characterisation Report
- Outer Galway Bay Indreabhán Shellfish Pollution Reduction Programme
- Outer Galway Bay Indreabhán Characterisation Report
- Sligo Bay Shellfish Pollution Reduction Programme
- Sligo Bay Characterisation Report
- Streamstown Bay Shellfish Pollution Reduction Programme
- Streamstown Bay Characterisation Report
- National Toolkit of Measures
- Strategic Environmental Assessment documents
- Habitats Directive Assessment documents

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 (S.I. No. 722 of 2003) Click here

European Communities (Water Policy) (Amendment) Regulations 2005, (S.I. No. 413 of 2005) Click here

Appendix 2: Contact Details for Local Authorities

Local Authority	Title	Telephone	General Email	Address
Clare	Director of Services Senior Engineer	065 6846331 065 6846331	enviroff@clarecoco.ie	Clare County Council, New road Office, Ennis, Co. Clare
Galway	Director of Services Senior Engineer	091 476401 091 476402	environment@galwaycoco.ie	Galway County Council, Aras an Chontae, Prospect Hill, Galway
Galway City	Director of Services Senior Engineer	091 536400 091 536400	environment@galwaycity.ie	Galway City Council, City Hall, College Road, Galway
Leitrim	Director of Services Senior Engineer	071 9620005 071 9620005	environment@leitrimcoco.ie	Leitrim County Council, Áras an Chontae, Carrick on Shannon, Co. Leitrim
Mayo	Director of Services Senior Engineer	094 902 44 44 094 902 44 44	environment@mayococo.ie	Mayo County Council, Castlebar, Co. Mayo
Roscommon	Director of Services Senior Engineer	090 6637260 090 6637260	environment@roscommoncoco.ie	Roscommon County Council, The Courthouse, Roscommon
Sligo	Director of Services Senior Engineer	071 9111900 071 9111900	enviro@sligococo.ie	Sligo County Council, County Hall, Riverside, Sligo

Appendix 3: Protected Areas in the Western RBD

Drinking Water - Groundwater	Drinking Water River Water Body		Drinking Water - Lake Water Body
Aghagower	Abbert (River)	Lyle (River)	Acorrymore (Lough)
Ballina	Abbert (River)	Mannin (River)	Arrow (Lough)
Ballyvaughan Uplands	Arrow [Unshin] (River)	Manulla (River)	Ballin Lough
Ballyvaughn	Bealnabrack (River)	Meander (River)	Barnahallia Lough
Belmullet	Bellananaminnaun (River)	Moyour (River)	Carra (Lough)
Belmullet Sg	Black (River)	Munkin (River)	Carrowmore Lake
Caherglassaun	Bonet (River)	Newport (River)	Carrowmore Lough
Carrowmore East	Bunowen (River)	Owenbeg (River)	Clogher Lough
Clare-Corrib	Camoge (River)	Owenboliska	Corrib Lower (Lough)
Clarinbridge	Carney (River)	Owencam (River)	Corrib Upper (Lough)
Cong-Robe	Castlehill (River)	Owenglin (River)	Cutra (Lough)
Corrib Sg	Clare (River)	Owenlobnaglaur (River)	Easky Lough
Coy	Clarinbridge (River)	Owenmore (River)	Gill (Lough)
Dunmore	Coole (River)	Owenriff (River)	Holan (Lough)
Errif (Kinlough/Tullaghan)	Corrib (River)	Rathavisteen (River)	Labe (Lough)
Foxford	Craughwell (River)	Robe (River)	Lackagh Lough
Kilkelly Charlestown	Cregg (River)	Saint Cleran's (River)	Loughaunore
Kinvara-Gort	Dawros (River)	Shanvaus (River)	Mask (Lough)
Laherdaun	Deel (River)	Sinking (River)	Moher Lough
Lough Mannagh	Dooyertha (River)	Skerdagh (River)	Talt (Lough)
Maam-Clonbur	Glencullin (River)	Sonnagh (River)	Tully (Lough)
Malranny	Glore (River)	Spaddagh (River)	
Moy Sg	Gortnaleck (River)	Srafaungal (River)	
Newport	Graigabbey (River)	Sruffaunanulra	
Rahasane	Gweestion (River)	Strade (River)	
Riverstown	Keel (River)	Streamstown (River)	
Roo West	Kilcogan (River)	Togher (River)	
Ross Lake	Killimor (River)	Trimoge (River)	
Shrule	Kilsellagh (river)	Waterdale (River)	
Swinford	Lugnamannaun (River)	Yellow (River)	

Special Areas of Conservation			
002268	Achill Head	000479	Cloughmoyne
000461	Ardkill Turlough	000480	Clyard Kettle-Holes
002244	Ardrahan Grassland	002034	Connemara Bog Complex
001403	Arroo Mountain	000252	Coole-Garryland Complex
001228	Aughrusbeg Machair And Lake	000485	Corraun Plateau
000463	Balla Turlough	001251	Cregduff Lough
002081	Ballinafad	001955	Croaghaun/Slievemore
002295	Ballinduff Turlough	000484	Cross Lough (Killadoon)
000474	Ballymaglancy Cave, Cong	000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)
000622	Ballysadare Bay	001257	Dog'S Bay
000996	Ballyvaughan Turlough	000492	Doocastle Turlough
002118	Barnahallia Lough	001497	Doogort Machair/Lough Doo
001922	Bellacorick Bog Complex	002181	Drummin Wood
000466	Bellacorick Iron Flush	000495	Duvillaun Islands
002005	Bellacragher Saltmarsh	001926	East Burren Complex
000623	Ben Bulben, Gleniff And Glenade Complex (includes Glencar lake)	001501	Erris Head
000020	Black Head-Poulsallagh Complex	000497	Flughany Bog
002032	Boleybrack Mountain	000268	Galway Bay Complex
000471	Brackloon Woods	001919	Glenade Lough
001656	Bricklieve Mountains & Keishcorran	000500	Glenamoy Bog Complex
000472	Broadhaven Bay	002180	Gortacarnaun Wood
000625	Bunduff Lough And Machair/Trawalua/Mullaghmore	001271	Gortnandarragh Limestone Pavement
000238	Caherglassaun Turlough	000503	Greaghans Turlough
002294	Cahermore Turlough	000278	Inishbofin And Inishshark
002293	Carrowbaun, Newhall And Ballylee Turloughs	001275	Inisheer Island
000475	Carrowkeel Turlough	000507	Inishkea Islands
000476	Carrowmore Lake Complex	000212	Inishmaan Island
000242	Castletaylor Complex	000213	Inishmore Island
002243	Clare Island Cliffs	001513	Keel Machair/Menaun Cliffs
001482	Clew Bay Complex	002320	Kildun Souterrain
001899	Cloonakillina Lough	000504	Kilglassan/Caheravoostia Turlough Complex
002111	Kilkieran Bay And Islands	001932	Mweelrea/Sheeffry/Erriff Complex
000458	Killala Bay/Moy Estuary	002144	Newport River
000286	Kiltartan Cave (Coole)	000532	Oldhead Wood
001285	Kiltiernan Turlough	001309	Omey Island Machair
002265	Kingstown Bay	000534	Owenduff/Nephin Complex
001669	Knockalongy And Knockachree Cliffs	002006	Ox Mountains Bogs

Special Areas of Conservation			
000516	Lackan Saltmarsh And Kilcummin Head	000318	Peterswell Turlough
000295	Levally Lough	000322	Rahasane Turlough
000296	Lisnageeragh Bog And Ballinastack Turlough	002298	River Moy
001673	Lough Arrow	000324	Rosroe Bog
001529	Lough Cahasy, Lough Baun And Roonah Lough	001312	Ross Lake And Woods
001774	Lough Carra/Mask Complex	001311	Rusheenduff Lough
000297	Lough Corrib	000525	Shrule Turlough
002117	Lough Coy	000541	Skealoghan Turlough
000299	Lough Cutra	000542	Slieve Fyagh Bog
002177	Lough Dahybaun	000328	Slyne Head Islands
000606	Lough Fingall Complex	002074	Slyne Head Peninsula
000522	Lough Gall Bog	001913	Sonnagh Bog
001976	Lough Gill	001680	Streedagh Point Dunes
000633	Lough Hoe Bog	000636	Templehouse And Cloonacleigha Loughs
000301	Lough Lurgeen Bog/Glenamaddy Turlough	001321	Termon Lough
000634	Lough Nabrickkeagh Bog	002031	The Twelve Bens/Garraun Complex
002119	Lough Nageeron	002179	Towerhill House
000304	Lough Rea	002130	Tully Lough
002008	Maumturk Mountains	000330	Tully Mountain
001536	Mocorha Lough	000637	Turloughmore (Sligo)
000054	Moneen Mountain	000638	Union Wood
002352	Monivea Bog	001898	Unshin River
000527	Moore Hall (Lough Carra)		
000470	Mullet/Blacksod Bay Complex		
002129	Murvey Machair		

Special Protected Areas			
004135	Ardboline Island and Horse Island SPA	004068	Inishmurray SPA
004133	Aughris Head SPA	004031	Inner Galway Bay SPA
004129	Ballysadare Bay SPA	004036	Killala Bay/Moy Estuary SPA
004177	Bills Rocks SPA	004050	Lough Arrow SPA
004037	Blacksod Bay/Broadhaven SPA	004051	Lough Carra SPA
004052	Carrowmore Lake SPA	004053	Lough Conn SPA
004136	Clare Island SPA	004042	Lough Corrib SPA
004107	Coole-Garryland SPA	004054	Lough Cullin (Mayo) SPA
004142	Cregganna Marsh SPA	004056	Lough Cutra SPA
004212	Cross Lough (Killadoon) SPA	004062	Lough Mask SPA
004055	Cross Lough (Mullet) SPA	004134	Lough Rea SPA
004170	Cruagh Island SPA	004088	Lough Scannive SPA
004035	Cummeen Strand SPA	004098	Owenduff/Nephin Complex SPA
004013	Drumcliff Bay SPA	004089	Rahasane Turlough SPA
004111	Duvillaun Islands SPA	004168	Slieve Aughty Mountains SPA
004067	High Island (Galway) SPA	004187	Sligo/Leitrim Uplands SPA
004074	Illanmaster SPA	004123	Slyne Head Islands SPA
004084	Inishglora and Inishkeeragh SPA	004072	Stags of Broadhaven SPA
004004	Inishkea Islands SPA	004093	Termoncarragh Lake and Annagh Machair SPA

Shellfish Waters	Bathing Waters	
Achill Sound North	An Trá Mór, Coill Rua, Indreabhán	Mullaghroe
Achill Sound South	Bathing Place at Loughrea Lake	Mulranny
Aughinish	Bertra	Rinroe, Carratigue
Ballinakill	Bishopsquarter	Rosses Point
Ballyvaughan/Poulnaclough Bay	Carrawmore	Salthill
Blacksod Bay	Céibh an Spidéil	Silver Strand
Clarin/Kinvara	Cill Mhuirbhigh, Inis Mór	The Harbour, Clare Island
Clew	Clifden	Trá an Dóilín, An Cheathrú Rua
Clifden Bay/Ardbear Bay	Dooega, Achill	Trá Chaladh Fínis, Carna
Drumcliff	Doogort	Trá na bhForbacha, Na Forbacha
Kilkieran	EllyBay, Belmullet	Trá na mBan, An Spidéal
Killala Bay	Enniscrone	Traught, Kinvara
Killary	Goirtín, Cloch na Rón	
Mannin Bay	Golden Strand, Achill	
Outer Galway Bay Indreabhán	Keel, Achill	
Sligo Bay	Keem, Achill	
Streamstown	Killala, Ross Strand	
	Louisburgh, Old Head Beach	
	Louisburgh, Silver Strand	

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

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 Environmental Objectives (Freshwater Pearl Mussel) Regulations, SI 296 of 2009
Drinking Waters Directive (98/83/EC)	European Communities (Drinking Water) (No.2) Regulations, SI 278 of 2007 Water Services Act (No 30 of 2007)
Major Accidents and Emergencies Directive (96/82/EC)	European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations, SI 74 of 2006 Planning and Development Act, No 30 of 2000 as amended 2002
Environmental Impact Assessment (85/337/EEC) as amended by Directive 2003/35/EC	Planning and Development Act, No 30 of 2000 as amended 2002 Planning and Development Regulations, SI 600 of 2001 as amended 2006 to 2007 Environmental Impact Assessment Regulations, SI 349 of 1989 as amended 1994 to 2006
Sewage Sludge Directive (86/278/EEC)	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 Wastewater Treatment Directive (91/271/EEC)	Urban Waste Water Treatment Regulations, SI 254 of 2001 as amended in 2004 and 2010. Water Services Act (No 30 of 2007)
Plant Protection Products Directive EU Regulation: (EC) No 1107/2009	Authorisation, Placing on the Market, Use & Control of Plant Protection Products Regulations, SI 83 of 2003 as amended from 2003 to 2009
Nitrates Directive (91/676/EEC)	European Communities (Good Agricultural Practice for the Protection of Waters) Regulations, SI 101 of 2009
Integrated Pollution Prevention Control Directive (2008/1/EC)	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: Western RBD Action Programme

What	Who leads	When & where
CO-ORDINATING ACTIONS		
Water Policy Regulations (SI 722 of 2003) as amended in 2005: **Purpose**: provide statutory basis for the provisions of the Water Framework Directive **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.	Public authorities in Regulations	2009–2015 National
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	EPA	2009–2015 National
Coordinate plan implementation at district level	Local authorities	2009–2015 Whole RBD
Support ongoing public participation and RBD Advisory Councils	Local & public authorities	2009–2015 Whole RBD
Conduct public awareness and targeted education campaigns, including disseminating information using tools such as Water Maps	DEHLG, local authorities	2009–2015 National
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 **Relevant Actions:**		2009–2015 National
Where necessary align the following plans and programmes with river basin management plans: • 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	Local authorities, NPWS, DEHLG, EPA, Coillte, OPW	

What	Who leads	When & where
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 • waste and sludge management plans • major accident emergency plans • forest management plans • flood risk management plans (forthcoming)		
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: • 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)		
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. **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. Cooperate on cross border bathing waters including exchange of information and joint action.		2009–2015 Designated sites
BIRDS AND HABITATS DIRECTIVES (79/409/EEC and 92/43/EEC)		
European Communities (Natural Habitats) Regulations (SI 94 of 1997) as amended in 1998 and 2005:		2009–2015

What	Who leads	When & where
Purpose: to ensure the protection of habitats and species of European importance. **Relevant actions:** Designate sites hosting habitats and species of European importance for inclusion in the Natura 2000 network as needed. Establish appropriate conservation measures, and management plans where necessary, to ensure achievement of favourable conservation status. 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. Promote education on the need to protect species and habitats, encourage research necessary to achieve the aims of the regulations. **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. **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. Examine discharge authorisations to designated areas and establish if they require review. Monitor the implementation of the sub-basin management plans and ensure their implementation.	 NPWS, DEHLG Relevant parties NPWS, DEHLG, DEHLG NPWS Public authorities DEHLG	Designated sites
DRINKING WATER DIRECTIVE (98/83/EC)		
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. **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	 Local authorities	2009–2015 Designated sites

What	Who leads	When & where
quality standards are not met. Prohibit water supplies considered to pose a potential danger to human health. Ensure compliance with the regulations and supervise group water schemes. **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. **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. 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. Supervise public water supplies	Local authorities, HSE EPA Local authorities DEHLG EPA	
MAJOR ACCIDENTS AND EMERGENCY DIRECTIVE (96/82/EC)		
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. **Relevant actions:** Prepare on-site emergency plans identifying major hazards and specifying prevention and mitigation measures. Prepare off-site emergency plans for action outside the establishment in the event of a major accident.	 Operators Local authorities	2009–2015 Qualifying sites

What	Who leads	When & where
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.	DETE	
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.		2009–2015 Qualifying sites
Relevant actions: Ensure that adequate controls are in place for relevant new developments.	Local authorities	
ENVIRONMENTAL IMPACT ASSESSMENT DIRECTIVE (85/337/EEC)		
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.		2009–2015 National
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.	Planning authorities	
SEWAGE SLUDGE DIRECTIVE (86/278/EEC)		
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.		2009–2015 National
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.	Local authorities	
Waste Management Act (No. 10 of 1996): **Purpose:** to regulate waste management in order to protect human health and the environment.		2009–2015 National
Relevant actions: Prepare sludge management plans for the management of wastewater sludge (taking account of WFD	Local authorities	

What	Who leads	When & where
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.		
URBAN WASTEWATER TREATMENT DIRECTIVE (91/271/EEC)		
Urban Wastewater Treatment Regulations (SI 254 of 2001) as amended in 2004 and 2010 (SI 48 of 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. **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 environment. Ensure that sewage sludge can be disposed of safely. Financial investments can be made under the Water Services Investment Programme.	Local authorities, DEHLG	2009–2015 National
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. **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.	Local authorities	2009–2015 National
PLANT PROTECTION PRODUCTS DIRECTIVE (91/414/EEC)		
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 **Relevant actions:** Notify the DEHLG of all new information on potentially dangerous effects of authorised plant protection products on the environment or groundwater.	Relevant person as defined in the Regulations	2009–2015 National

What	Who leads	When & where
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.		
NITRATES DIRECTIVE (91/676/EEC)		
eGood 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).		2009–2015 National
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.	DEHLG, DAFF	
Monitor as necessary for the purposes of the Regulations. Provide recommendations and direction to local authorities with respect to monitoring, inspections and measures.	EPA	
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).	Local authorities, DAFF	
Additional actions: Agriculture: Consider increasing farm inspections in karst areas with turloughs and piloting of environmentally friendly farming scheme Map turloughs' zones of contribution.	DAFF, NPWS	
INTEGRATED POLLUTION PREVENTION CONTROL DIRECTIVE (2008/1/EC)		
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.		2009–2015 National
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	EPA	

What	Who leads	When & where
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. Obtain the consent of sanitary authorities for discharges to sewers	 Operator	
COST RECOVERY FOR WATER SERVICES		
Water Pricing Policy: **Purpose:** to promote the conservation and efficient use of water resources in accordance with the Water Framework Directive **Relevant actions:** Develop and implement strategy to achieve water metering of domestic users connected to public water supplies. Introduce legislation to allow local authorities to charge domestic users for water services. Develop charging methodology for water services and introduce water charges for domestic users.	 DEHLG DEHLG Local Authorities	2009–2015 National
PROMOTION OF EFFICIENT AND SUSTAINABLE WATER USE		
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. **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. Rehabilitate and repair water works. Ensure that water distribution systems are in a fit state and free from leaks. **National Water Conservation (Leakage Reduction) Programme:** **Purpose:** to establish water conservation and leakage control strategies.	 DEHLG Local Authorities Premises owner/occupier	2009–2015 National 2009–2015 National

What	Who leads	When & where
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.	Local authorities, DEHLG	
PROTECTION OF DRINKING WATER SOURCES		
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.		2009–2015 National
Relevant actions: Control the location and nature of developments and activities in accordance with groundwater protection schemes.	Local authorities	
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.		2009–2015 National
Relevant actions: Exclude chemical and organic fertilisers and farm manures from within specified distances of wells, boreholes, springs or abstractions points	Farmers	
Planning and Development Act (No. 30 of 2000): **Purpose:** to provide for the proper planning and development of urban and rural areas.		2009–2015 National
Relevant actions: Control of developments and activities in order to protect water resources.	Local authorities, An Bord Pleanála DEHLG	
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.		2009–2015 Designated sites
Relevant actions:		

What	Who leads	When & where
Keep Register of Protected Areas, which includes protected drinking waters, updated.	EPA	
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 > 10m^3 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.	To be assigned	
Consideration is also being given to the designation of safeguard zones around current and future abstractions under the Drinking Water Regulations.	To be assigned	
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.		
Relevant actions: Perform functions in a manner that does not knowingly cause or allow deterioration in the quantitative status of a body of groundwater.	Public authorities	
All direct discharges of pollutants into groundwater are prohibited subject to certain exemptions.	Local authorities	
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.	EPA	
Identify hazardous and non-hazardous substances for the purpose of preventing and limiting pollutant inputs	EPA	
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.	EPA	
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.	EPA	

What	Who leads	When & where
Where necessary or appropriate: (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; (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 ; (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;	EPA	
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.	Relevant authorities	
Environmental Objectives (Surface Water) Regulations (SI 272 of 2009): **Purpose:** The establishment of legally binding objectives for all surface waters.		
Relevant actions: Achieve compliance with drinking water protected area objectives.	Public authorities	
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.		
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.	Local authorities	
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.	DEHLG	
Supervise public water supplies	EPA	

What	Who leads	When & where
ABSTRACTION AND IMPOUNDMENTS		
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.		2012–2015 National
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.	Local authorities	
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		2012–2015 National
Relevant actions: Maintain registers of abstractions and make available to the public.	Local authorities	
Water Supplies Act (No. 1 of 1942): **Purpose:** require that provisional orders be obtained by local authorities abstracting drinking water supplies.		2009–2015 Prioritised sites
Relevant actions: Local authorities must adhere to conditions set down in provisional orders when abstracting drinking water from a water source.	Local authorities, DEHLG	
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.		2009–2015 Prioritised sites
Relevant actions: Local authorities must obtain planning permission for groundwater abstractions for public drinking water supplies.	Local authorities, An Bord Pleanála	
Additional actions: Abstractions: Good practice measures are available in the Programmes of Measures – technical studies – Abstractions and		

What	Who leads	When & where
National Summary Programme of Measures background documents.		
POINT SOURCE DISCHARGES		
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. .		2009–2015 National
Relevant actions: Establish measures to achieve the quality objectives and standards. Where necessary, consult with other public authorities.	Public authorities	
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.	Local authorities, EPA, DEHLG	
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.	EPA	
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.	Coordinating local authority	
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.		2009–2015 National
Relevant actions: All direct discharges of pollutants into groundwater are prohibited subject to certain exemptions.	Local authorities	
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.	EPA	

What	Who leads	When & where
Identify hazardous and non-hazardous substances for the purpose of preventing and limiting pollutant inputs	EPA	
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.	EPA	
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.	EPA	
Where necessary or appropriate: (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; (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 ; (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;		
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.	Relevant authorities	
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.		2009–2015 National
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.	Local authorities Local authorities,	

What	Who leads	When & where
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. Notify local authorities of accidental discharges and spillages of polluting materials which enter, or are likely to enter, waters. **Wastewater Discharge Authorisation Regulations (SI 684 of 2007):** **Purpose:** to provide for the authorisation by the EPA of urban waste water discharges by local authorities. **Relevant actions:** Authorise Local Authority WWTPs (taking account of WFD objectives). Review licenses at intervals not less than 6 years. Enforce compliance with WWTP licensing conditions. Maintain a register of WWTP licences and certificates and make available on request. **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. **Relevant actions:** Prepare and implement Water Services Strategic Plans. Duty of care on owners of premises to ensure that treatment systems for wastewater are kept in good condition. **Additional actions: Urban Wastewater Treatment Plants:** Measures for improved management: keep register of plant capacity and update annually; install facilities to monitor influent loads and effluent discharges in accordance with EPA guidelines and best practice; put auditable procedures in place to monitor compliance of licensed discharges; implement training procedures for staff involved with licensing of discharges; monitor receiving water quality upstream and downstream of the point of discharge. Optimise treatment plant performance by the implementation of a performance management system supported by the use of decision making tools.	Fisheries Boards, NPWS Relevant persons EPA Local Authorities Relevant Persons Local Authorities Local Authorities	2009–2015 National 2009–2015 National 2009–2015 Prioritised Sites

What	Who leads	When & where
Actions have been identified for certain categories of treatment plant: • Category 1 - Agglomerations with treatment plants requiring identifiable Capital Works. • Category 2 - Agglomerations with treatment plants requiring further investigation prior to Capital Works. • Category 3 - Agglomerations requiring the implementation of actions identified in Pollution Reduction Plans for Shellfish Waters designated under the Shellfish Water Regulations. • Category 4 - Agglomerations with treatment plants requiring improved operational performance through the implementation of Performance Management Systems. • Category 5 - Agglomerations requiring investigation of Combined Storm Overflows (CSOs). • 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 requiring management of development.		2009–2015 National
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.	DCENR	
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		2009–2015 Prioritised Sites
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.	DCENR Local authorities,	
Energy Act (No. 40 of 2006): **Purpose:** to regulate the energy industry whilst managing potential impact on the water environment		2009–2015 Prioritised Sites
Relevant actions:		

What	Who leads	When & where
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. **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. **Relevant actions:** Prepare an inventory of closed waste disposal or recovery sites. **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. **Relevant actions:** Undertake monitoring and investigate pollution. Develop and implement Shellfish Pollution Reduction Programmes, including any necessary measures, to achieve shellfish water quality standards. **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. **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.	EPA, GSI DEHLG, Local authorities Public authorities	2009–2015 Designated sites 2009–2015 Designated sites
DIFFUSE SOURCE DISCHARGES		
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. **Relevant actions:** Serve notices or directions on persons requiring measures to be taken in order to prevent or control pollution of	Local authorities,	2009–2015 National

What	Who leads	When & where
waters, where necessary. Notify local authorities of accidental discharges and spillages of polluting materials which enter, or are likely to enter, waters. **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. **Relevant actions:** Grant permission for on-site waste water treatment systems subject to site suitability assessment. **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. **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. The guidance is supported by DEHLG circular letter (Reference PSSP 1/10) and Planning Guidelines on Sustainable Rural Housing (2005) 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. For existing unsewered properties, bring forward and consult on proposals for legislation to provide standards	Fisheries Boards, NPWS Relevant persons Local authorities Planning authorities, developers, manufacturers designers, installers and operators Planning authorities & An Bord Pleanála DEHLG Minister for the Environment, Heritage and	2009–2015 National 2009–2015 National 2010

What	Who leads	When & where
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.	Local Government	
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.		2009–2015 National
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.	Forest Service	
Relevant actions:	Forest Service	
Promote forestry with financial incentives. License forestry activity and where necessary, attach additional conditions in sensitive areas.	Minister for the Department of Agriculture, Fisheries and Food	
Encourage sustainable, commercial afforestation. Ensure compliance with guidance and codes of practice.		
A new Forestry Bill, replacing the 1946 Forestry Act, has been drafted to strengthen sustainable forestry management. Provisions relating to water protection are; • 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.	Forest Service, EPA	
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.	Forest Service	
2008 guidelines for the protection of Natura 2000 sites designated for the protection Freshwater Pearl Mussel		

What	Who leads	When & where
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.		2009–2015 National
Strategic Plan for the Development of Forestry: **Purpose:** to provide for the development and regulation of forestry. **Relevant actions:** Adhere to forest management plans and the principles of sustainable forest management. Ensure implementation of the National Forestry Standard and adherence to the code of best forest practice.	All stakeholders Forest Service	
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.		2009–2015 Designated sites
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. **Relevant actions:** Develop management plans (sub-basin plans of River Basin Management Plans), including any necessary measures, to ensure achievement of environmental quality objectives.	NPWS, relevant public authorities	
AUTHORISATION OF DISCHARGES TO GROUNDWATERS		
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. **Relevant actions:** Review all existing discharge authorisations to take into account the new quality standards. **Wastewater Discharge Authorisation Regulations (SI 684 of 2007):**		2009–2015 National

What	Who leads	When & where
Purpose: Where a local authority proposes to discharge urban waste water effluent to groundwater an authorisation by the Environmental Protection Agency is required.	Local authorities	
Relevant actions: Authorisation of Local Authority WWTPs effluent discharges discharging to groundwater.	EPA	2009–2015 National
Water Pollution Act (No 1 of 1977) as amended in 1990: **Purpose:** to provide for the control of water pollution**.**		
Relevant actions: License discharges to groundwaters 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.	Local authorities	2009–2015 National
PRIORITY SUBSTANCES		
Environmental Objectives (Surface Water) Regulations (SI 272 of 2009): **Purpose:** to provide for quality objectives for surface waters, EQSs for pollutants, review of discharge authorisations, classification of surface waters, inventories of priority substances.		2009–2015 National
Relevant actions: Prepare a plan for the progressive reduction of pollution by priority substances and the ceasing or phasing out of emissions, discharges and losses of priority hazardous substances. Establish an inventory of emissions discharges and losses of priority substances, priority hazardous substances and other pollutants and publish a summary of the inventory.	EPA, coordinating local authority	
Chemicals Act (No. 13 of 2008): **Purpose:** to provide for the regulation of certain dangerous chemicals.		2009–2015 National
Relevant actions: Administration and enforcement of the European Registration, Evaluation and Authorisation of Chemicals regulations (REACH).	Health and Safety Authority	
Identify and manage risks linked to the chemicals manufactured or imported and registration of chemicals produced or imported in quantities greater than 1 tonne.	Manufacturers or importers of chemicals	
European Pollutant Release and Transfer Register Regulations (SI 123 of 2007):		2009–2015

What	Who leads	When & where
Purpose: the prevention and reduction of pollution by the establishment of a publicly accessible pollutant release and transfer register. **Relevant actions:** Submit required data in relation to releases of pollutants and off-site transfers of pollutants and waste. 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.	 Operators EPA	National
PHYSICAL MODIFICATIONS		
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: **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. **Relevant actions:** Consider the environmental impacts of developments as part of the planning process. **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. Investigate the ecological potential of heavily modified waters and implement identified mitigation measures.	 Local authorities Relevant public authorities	2009–2015 National 2009–2015 Prioritised sites
OTHER ACTIVITIES IMPACTING ON WATER STATUS		
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.	DEHLG	2009–2015 National
PREVENTION OR REDUCTION OF THE IMPACT OF ACCIDENTAL POLLUTION INCIDENTS		
Framework of Major Emergency Management **Purpose:** framework for emergency preparedness and response capability identifying hazards and risk to		2009–2015 National

What	Who leads	When & where
society, the economy, but also the environment including our natural water resource. **Relevant actions:** Prepare Major Emergency Plans with supporting plans, procedures and arrangements. Initiate a major emergency 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. Ensure and promote implementation of the Framework.	Local authorities, An Garda Síochána, HSE Dept of Justice, Equality & Law Reform, Dept of Health & Children, DEHLG	
OTHER ISSUES		
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.	DEHLG, EPA	2009–2015 National
Invasive alien species: support measures being developed by the national alien species study (conducted by QUERCUS) and local investigations at district level including the Central Fisheries Board Study into the African curly leaved pondweed on Lough Corrib and the Western Regional Fisheries Board Bio-security Plan for Lough Mask	NPWS, Central Fisheries Board local authorities	2009–2015 National 2009–2015 Prioritised sites
Cruising and boating: enforce pump-out control and speed restrictions at district level.	Waterways Ireland, local authorities	2009–2015 Prioritised sites
Peat extraction: enforce licensing controls and rehabilitation plans at district level.	EPA, local authorities, Bord na Móna	