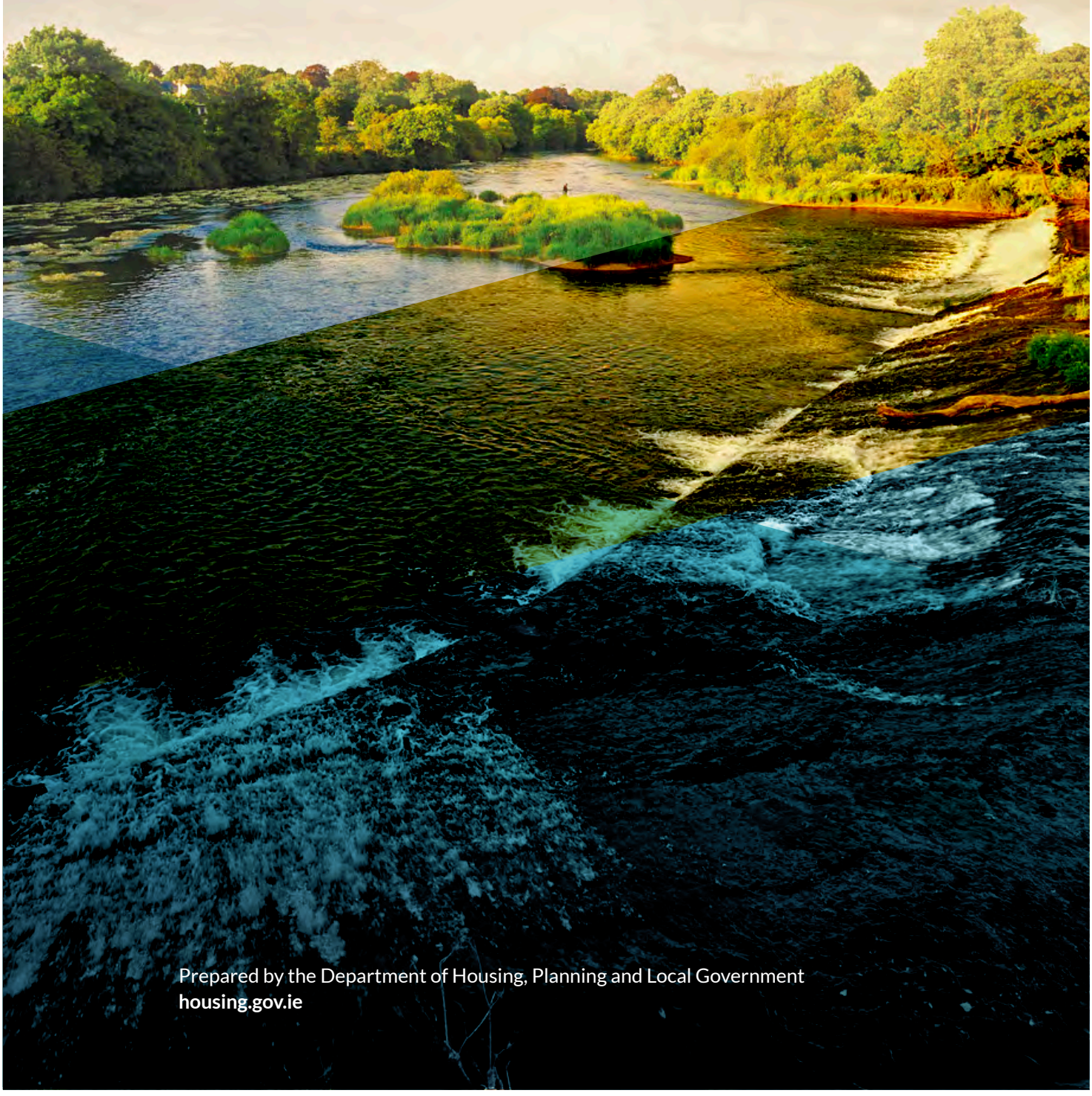
Rialtas na hÉireann
Government of Ireland

River Basin Management Plan for Ireland

2018 - 2021



Prepared by the Department of Housing, Planning and Local Government
housing.gov.ie

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WATER
essential for life
vital to our environment
central to communities
critical to our economy

Foreword

Water is of fundamental importance to life and our natural environment. Directly or indirectly, it affects all aspects of life. Good water quality is critical to our well-being, as individuals, as a society, as an economy and as a country. It follows, then, that by protecting water quality we are protecting a resource which is fundamental to Ireland as we know it. Our water bodies provide us with drinking water, but are also sources of amenity for our people and visitors to our country alike. The careful stewardship of our aquatic environment underpins our well-being and our economy. Good water quality is a key driver of economic activity in sectors such as agri-food, pharmaceuticals and tourism that rely on a safe and secure water supply. At an even more rudimentary level, our water bodies are a natural resource which was passed down to us by previous generations. We owe it to ourselves and to future generations to protect our water resources.

Over the last decade, the quality of our water has stood still. As we look to the future, we are faced with increasing demands on our water resources from a growing population and economy. It is essential that we take strong steps to protect and improve our water quality; by both making river basin management plans and implementing them. We are addressing this imperative. This *River Basin Management Plan* is a new approach to the protection, improvement and sustainable management of the water environment. We now have a much-improved evidence base to support the development of new national policies and initiatives, and to more effectively guide the deployment of supporting measures at local level.

We have reached out to people through extensive consultation at national policy and local community levels. The strong feedback received has directly shaped the new and revised policies which are contained in this Plan. We have learned from the experiences of the first cycle of river basin management planning and given careful consideration to ensuring better on-the-ground delivery of measures. New governance and implementation structures will drive co-ordinated delivery and give people and representative groups a voice and influence on policy development and delivery.

With effective implementation, we can expect to see the Plan's ambitious suite of measures translated into tangible improvements in water quality in over 700 water bodies. The investment of €1.7 billion in waste-water infrastructure over the period of this Plan to 2021 will see over 250 projects in urban areas progressed. Over the same period, we will take decisive steps towards sustainable and efficient water use, reducing leakage from our water network by 61 billion litres per year. We will enhance the assessment of risks to water quality in our planning processes, and significantly increase the numbers of people on the ground, analysing water quality at water catchment level and working with communities to address challenges.

This *River Basin Management Plan* will build the foundations and momentum for the long-term delivery of water-quality improvement. The improved implementation and engagement structures which have guided the Plan's creation are the foundations for taking better care of our water environment for the future.

Eoghan Murphy, T.D.
Minister for Housing, Planning and Local Government

Contents

Acknowledgements

Images by Ruairí Ó Conchúir, LAWCO, on p. 5 (Owenriff River, Oughterard, Co. Galway); p.28 (Mulkear River, Co. Limerick); p.31 (Caragh River, Co. Kerry); p.34 (Doo Lough, Co. Mayo); p.42 (Dead River, Co. Limerick); p.46 (Mullaghmore, Burren National Park, Co. Clare); p.103 (Clare Glens, Co. Tipperary); p.128; p.144 (Lickeen Lake, Co. Clare).

Image by Jimmy McVeigh, LAWCO, on p.27 (Leenan catchment), p. 115 (Lough Melvin, Co. Leitrim).

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Thanks to all.

Irish River Basin District

70,273km² Total area

46 Catchment Areas → **4,829** water bodies

	Compliance with EU standards (2015)
Rivers	**57%**
Lakes	**46%**
Coastal waters	**79%**
Groundwater bodies	**91%**

Protected Areas

	Compliance with EU standards (2015)
140 Designated bathing waters	**93%**
64 Shellfish waters	**75%**
358 Water-dependent Special Areas of Conservation (SACs)	**60%**

Executive Summary: River Basin Management Plan, 2018–2021

Good water quality is vital to the well-being of our society, economy and environment. Perhaps most obviously, our rivers and lakes are the sources of our drinking water. In addition, they are not only essential parts of our natural environment but also a treasured national asset that communities and tourists want to enjoy. By protecting our water quality, we will also help to protect public health. By improving our aquatic environment, we will help to sustain jobs in water-intensive sectors, such as agri-food and tourism, sectors that collectively sustain over 400,000 jobs. By preserving these waters, we will preserve our natural heritage for future generations.

This second River Basin Management Plan (RBMP) outlines the new approach that Ireland will take as it works to protect its rivers, lakes, estuaries and coastal waters over the next four years. Building on the lessons learned from the first river basin management planning cycle, the Government is now planning on the basis that Ireland is defined as a single River Basin District. The new Plan uses a much-improved evidence base to underpin decision-making, at both national and local levels. This Plan also benefits from a stronger and more integrated approach to public consultation and engagement. The Government is introducing new initiatives and policies to address many of our water-quality challenges. The new Plan builds on the measures implemented during the first planning cycle, but also seeks to implement supporting measures on a prioritised basis, where necessary.

With effective implementation of the Plan, Ireland can expect to see actions to improve water quality in over 700 water bodies. Changes in agricultural approaches and an increase in urban waste-water treatment should lead to reduced pollution pressures. The new structures and evidence-based approach, combined with the development of capabilities and expertise, will lay the foundations for consistent progress to be made in addressing a long-term challenge faced by many developed economies.

Consequently, the Plan has placed a major emphasis on establishing the right governance and delivery structures for an effective catchment-based approach. Clear priorities are set out in the Plan, which will ensure that all stakeholders are working together with a strong focus on delivering positive outcomes. National authorities retain responsibility for the implementation of national programmes, with regional structures driving the implementation of prioritised supporting measures. Meaningful stakeholder and public engagement is being led by the recently-established Water Forum (An Fóram Uisce) and the Local Authority Waters and Communities Office (LAWCO). The former facilitates public and stakeholder engagement in water policy at national level, while the latter drives public engagement, participation and consultation with communities and stakeholders at local and regional level. This engagement is further supported by the catchments.ie and watersandcommunities.ie websites — and by a wide range of other activities aimed at facilitating and encouraging engagement.

Some of the most important measures in the Plan include planned investment by Irish Water of approximately €1.7 billion in waste-water projects, programmes and asset maintenance; the deployment of 43 local authority investigative assessment personnel, who will work in Prioritised Areas for Action; a new collaborative Sustainability and Advisory Support Programme between Government and the dairy industry, consisting of 30 Sustainability Advisors promoting agricultural best practice in 190 Areas for Action; improved controls for the management of water abstractions; the development and implementation of a *"Blue Dot Catchments Programme"* for the protection of high-status waters; the extension of the grant scheme for repairs, upgrade and replacement of domestic waste-water treatment systems, with priority given to high-status catchments; the creation of a Community Water Development Fund to support community water initiatives; and the development of a collaborative approach to protecting drinking-water sources.

This Plan's objectives are ambitious, which is reflected both in the level of commitment to and investment in existing measures and in the expectation that supporting measures will be

implemented in approximately 700 prioritised water bodies over the period of this cycle. This will result in status improvements for approximately 150 water bodies. Combined with improved implementation and engagement structures, this should see good progress in making water-quality improvements and in building capabilities, knowledge and expertise for the future.

This Executive Summary outlines the key aspects of the second-cycle RBMP. It provides:

- A brief introduction and background to the second-cycle RBMP
- Details of the key findings of the most recent water-quality results and of the outcomes of the risk-characterisation process in terms of the share of total water bodies found to be *At Risk* of not meeting the requirements of the Water Framework Directive (WFD)
- Summary information on the significant pressures for *At Risk* water bodies
- Details of the environmental objectives of the WFD and of the priorities for this second planning cycle, given the scale of the challenge presented
- An outline of the key existing and supporting measures (from our full Programme of Measures) aimed at meeting our environmental objectives
- Descriptions of the Plan's implementation strategy and structures, and of the measures we are taking to improve communication and public and stakeholder engagement
- A summary of the expected outcomes, based on our proposed measures and implementation plans

Introduction & Background

The Irish River Basin District (RBD) covers an area of 70,273km^2, with 46 catchment management units — consisting of 583 sub-catchments, with 4,829 water bodies. With regard to protected areas within the District, there are 140 designated bathing waters, 64 shellfish waters, 47 nutrient sensitive areas and 358 special areas of conservation (SACs) with water dependency. These SACs are geographically concentrated along the western seaboard - with a significant overlap between high-status waters and SACs. The RBD has a population of around 4.76 million, with 33% of people living in cities, 29% in towns and 38% in rural areas. The requirement for water and waste-water services reflects these spatial patterns. Nationally, the economy is strongly export-focused, but the sectoral drivers of economic growth across the RBD are diverse – with the agriculture and food sectors being particularly important in rural areas.

This second-cycle RBMP aims to build on the progress made during the first cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). The former measure has resulted in significant progress in terms both of compliance levels and of the impact of urban waste-water on water quality. The latter provides a considerable environmental baseline which all Irish farmers must achieve and has resulted in improving trends in the level of nitrates and phosphates in rivers and groundwater. It is acknowledged, however, that sufficient progress has not been made in developing and implementing supporting measures during the first cycle.

In more general terms, three key lessons have emerged from the first cycle and the public consultation processes. These lessons have been firmly integrated into the development of the second-cycle Plan. Firstly, the structure of multiple RBDs did not prove effective, either in terms of developing the plans efficiently or in terms of implementing those plans. Secondly, the governance and delivery structures in place for the first cycle were not as effective as expected. Thirdly, the targets set were too ambitious and were not grounded on a sufficiently developed evidence base.

In line with these three key lessons, we have used three guiding principles in developing this finalised RBMP. Firstly, the development and implementation of this Plan requires effective and efficient national, regional and local structures — and thorough integration of these structures to ensure effective co-ordination between scientific understanding of the problems to be addressed, policy development and on-the-ground delivery. Secondly, the targets set in the Plan must be based on sound evidence and be ambitious but achievable. Thirdly, we must continue to ensure that effective national measures are in place to address pressures throughout the entire RBD. Where such broad-based measures are not sufficient, however, the delivery of supporting measures must be prioritised, ensuring the implementation of *"the right measures in the right place"*.

Water Quality Status and Catchment Characterisation

The 2013-15 water-body status information shows that 57% of river water bodies, 46% of lakes, 31% of transitional waters and 79% of coastal waters had achieved good or high-status. For groundwater, 91% of water bodies are classified as having good status. Nationally, the number of monitored river water bodies and lakes at good or high status appears to have declined by 4% since 2007–2009. However, this decline also masks an underlying trend of improvement and disimprovement across monitored river water bodies and lakes since 2009.

Figures from the Environmental Protection Agency (EPA) show that over 1,000 river water bodies and lakes have changed status over the period of the first cycle. The findings also show that high-status waters remain under continued pressure — with 10% of monitored river sites having high-status in 2013–15 compared to 13% in 2007–2009.

For our protected areas, 93% of bathing waters met the required standards in 2015. For shellfish waters, the most recent information for 2015 shows 75% of sites meeting the microbiological guide value. For SACs with water dependency, approximately 60% of river water bodies and almost 70% of lakes achieved their required status. However, the situation for SACs in transitional waters was less positive — with 37% of such areas meeting their required standard by achieving good status.

The RBD characterisation process goes beyond the classification of status and assesses whether a water body is *At Risk* of not meeting its objectives (i.e. good status or high status). This assessment is made by reviewing information on such matters as current water-quality trends and catchment pressures. Expert local knowledge is important in this context. Currently 2,113 water bodies are classified as *Not at Risk* and 1,460 are classified as *At Risk*, with the remainder requiring further investigation.

Significant Pressures on *At Risk* Water Bodies

Having identified those water bodies *At Risk* of not meeting their objectives, the characterisation process then looks at the significant pressures causing this risk. Figure 1 below shows the frequency of significant pressures on *At Risk* water bodies. While agriculture is the most prevalent pressure, it is also the largest land use. The significant pressures impacting on the 1,460 water bodies that are *At Risk* of not meeting their objectives include agriculture (53%), hydromorphology (24%), urban waste-water (20%), forestry (16%), domestic waste-water (11%), urban runoff (9%), peat (8%), extractive industry (7%) and mines and quarries (6%). Turning to the *At Risk* river and lake water bodies, we find that 47% of them are subject to a single significant pressure, with the remaining 53% subject to more than one significant pressure.

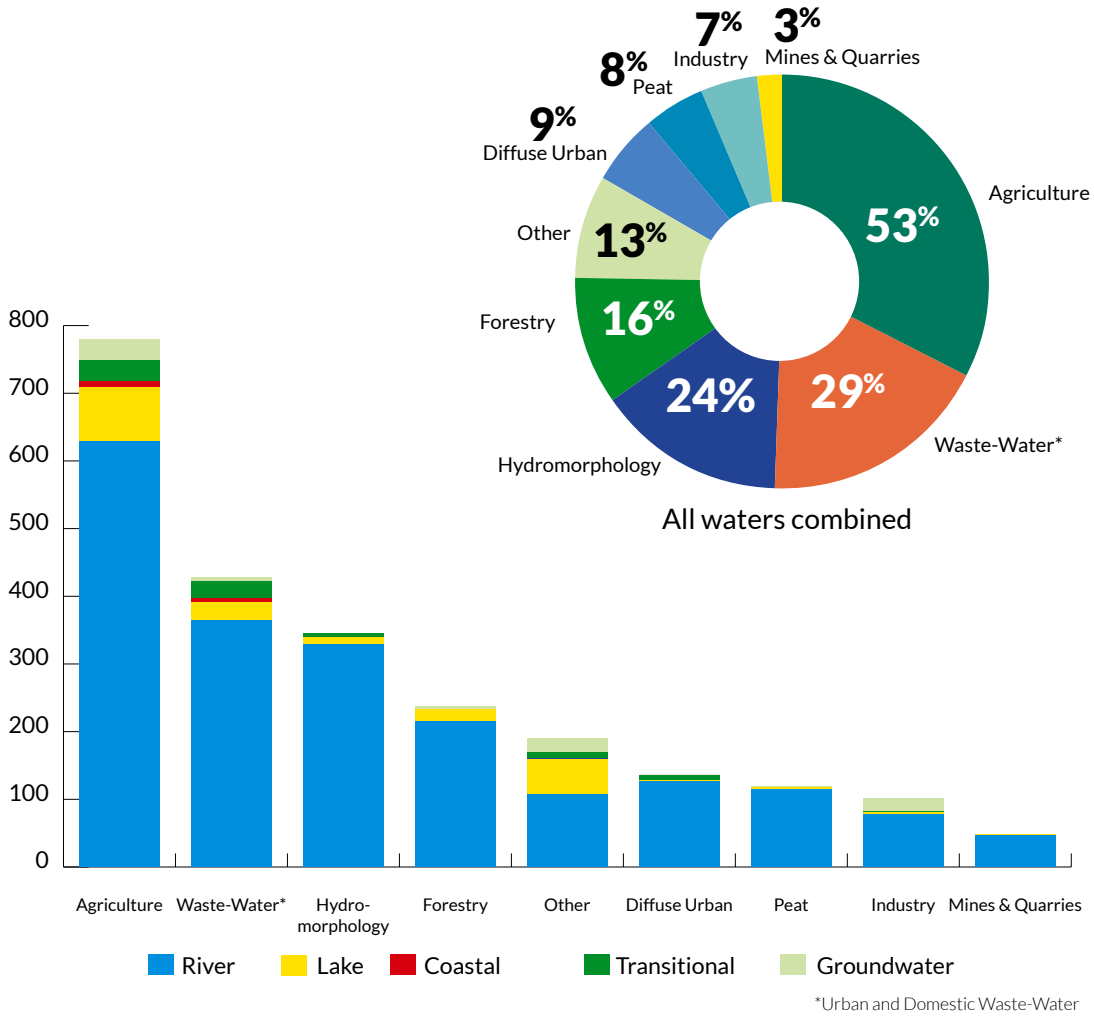


Figure 1 - Frequency of significant pressures and source of pressures on *At Risk* water bodies.

Environmental Objectives and Priorities

In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

Although the objectives of the Directive clearly set out the end goals, the challenges presented in achieving these objectives are very significant. Therefore, a key purpose of this Plan is to identify priorities and ensure that implementation of the Plan is guided by these priorities. The following evidence-based priorities have been adopted for this river basin planning cycle:

- Ensure full compliance with relevant EU legislation
- Prevent deterioration
- Meet the objectives for designated protected areas
- Protect high-status waters
- Implement targeted actions and pilot schemes in focused sub-catchments aimed at (1) targeting water bodies close to meeting their objective and (2) addressing more complex issues that will build knowledge for the third cycle

Programme of Measures — Summary of Key Measures

In line with the pressures identified through the characterisation process, and the priorities set out above, the following are the key measures aimed at moving towards meeting the environmental objectives of the WFD:

- An Agricultural Sustainability Support and Advisory Programme will be established. This programme will be implemented by 30 new Advisors — funded by Department of Housing, Planning and Local Government (DHPLG), Department of Agriculture, Food and the Marine (DAFM) and the dairy co-ops — who will work under Teagasc and the dairy co-ops. The Advisors will work on a one-to-one basis with farmers to bring about behavioural change through improved agricultural practices in areas which have identified pressures on water bodies.
- Local authorities are putting in place Support and Advisory Teams to carry out scientific assessments and to drive the implementation of mitigation measures at local level. Recruitment of investigative assessment personnel commenced in Quarter 1 2018 and provision has been made for up to 43 specialist staff to be in place by mid-2018. These resources will be assigned across the five regions.
- Agri-environment schemes will be implemented through the Rural Development Programme (RDP). This will lead to investment in manure storage and improved nutrient utilisation. In particular, the targeted approach to the Green, Low-Carbon, Agri-Environment Scheme, which has 50,000 participants, will ensure appropriate supporting measures on farms to protect and improve water quality.
- Compliance with the Good Agriculture Practice Regulations will be improved through implementation of the enhanced Nitrates Action Programme (NAP) for 2018–2021 and of the associated inspection regime. The Programme entails new strengthened water-protection measures, focused on intercepting and breaking nutrient transport pathways and on preventing sediment and nutrient losses to waters.
- Knowledge-transfer programmes within the agriculture sector will be used to promote better nutrient management and point-source-pollution management on the farm. The approach to this will have three strands:
  - The National Dairy Sustainability Forum will aim to collaboratively address the on-farm economic and environmental sustainability challenges for the dairy industry in a broader and more strategic way than currently takes place. This Forum will build on the knowledge base that has developed over recent years. To do so it will establish a co-operative-led pilot programme to implement best practice on selected farms. It will also develop a wider promotion programme on better nutrient management and farm point source management to be implemented for dairy farmers supplying co-operatives. It is envisaged that this approach will be part of an evolution of the existing Origin Green scheme.
  - A knowledge transfer programme for farmers will be funded through the RDP to be delivered by both Teagasc and private-sector consultants. This will aim to engage with up to 20,000 farmers over the period 2017–2021.

- An on-line nutrient-management-planning system will be rolled out for use by all farmers. Use of this system will be mandatory for farmers in the GLAS scheme and for derogation farmers.

- The National Inspection Plan 2018–21 for domestic waste-water treatment systems, currently being finalised by the EPA, will use the outputs of the catchment characterisation work to further improve the risk-based approach to inspection of septic tanks. It is expected that approximately 1,000 inspections will be carried out by local authorities nationally each year.
- There is significant planned investment in urban waste-water collection and treatment infrastructure. Over the period 2017–2021, Irish Water will invest approximately €1.7 billion in waste-water projects, programmes and asset maintenance.
- Forestry regulations and policy have been re-aligned to contribute to achieving water-quality objectives, and these will be fully implemented. Forestry funding schemes and other resources will be promoted and strategically deployed to protect and improve water quality.
- For peat extraction, new legislation is to be introduced to improve the environmental regulation of large and small scale commercial peat harvesting. The Department of Culture, Heritage and the Gaeltacht will oversee the implementation of the Peatland Strategy. Bord na Móna will implement their Sustainability 2030 Strategy and Biodiversity Action Plan, both of which address the long-term rehabilitation of cutaway bogs.
- Relevant EU regulation with regard to Invasive Alien Species (IAS) will be implemented, along with specific plans for priority IAS. Clear governance and co-ordination structures across relevant bodies will be developed, and community engagement harnessed to ensure the long-term sustainability of projects aimed at preventing and mitigating pressures from IAS.
- To work to address significant pressures arising from hydromorphology, the EPA and Inland Fisheries Ireland will improve assessment methods and knowledge in relation to the physical condition of rivers, lakes and marine coastal waters to inform and support future management measures. The Office of Public Works (OPW) will incorporate mitigation measures when undertaking channel maintenance over 2,000 kilometres per year.
- In addition, the feasibility of implementing measures to improve fish connectivity in the Lower Shannon catchment will be assessed.
- The DPHLG will establish a register of water abstractions, and will consult on a proportionate and risk-based framework for the regulation of abstractions to ensure continued sustainable use of our water resources. The EPA will continue work on assessing risk due to abstractions, making use of new information as it emerges during the second cycle.
- To protect and restore our high-status waters, we will establish a *"Blue Dot Catchments Programme"* and associated working group. This will ensure that high-status waters are prioritised for the implementation of supporting measures and for available funding.
- For protected areas:
  - Around 350 public drinking water source risk assessments will be completed by 2021, with the remaining assessments to be completed by 2027.
  - Urban waste-water pressures in four of the currently non-compliant bathing waters will be addressed through the aforementioned Irish Water Investment Plan.
  - Urban waste-water discharges in the vicinity of shellfish waters will continue to be assessed to determine whether they are contributing to failures in shellfish water objectives and, in turn, whether additional waste-water treatment is required.
  - Also through the Irish Water Investment Plan, and in accordance with the requirements of the Urban Waste Water Treatment Directive, more stringent treatment will be provided for 8 currently non-compliant urban areas discharging to designated nutrient sensitive areas.

Implementation Strategy

Our implementation strategy focuses on ensuring full implementation of the existing measures through the relevant national authorities and, where these measures are not sufficient to meet the objectives of the WFD, on implementing targeted supporting measures. The process of selecting the water bodies to be targeted for action through supporting measures was driven at regional and local level through local authority structures. The prioritisation of water bodies has taken place through 5 regional committees, each chaired by a local authority Chief Executive. This prioritisation used the EPA catchment assessments as a starting point, with the prioritisation of areas and actions agreed with relevant stakeholders based on wider considerations of impacts and feasibility.

Learning from the lessons of the first cycle, the implementation structures will ensure effective and co-ordinated delivery of measures. The Water Policy Advisory Committee (WPAC), established as part of the structures for the preparation of this RBMP, provides high-level policy direction and oversight of implementation. A National Co-ordination and Management Committee (NCMC) has been set up under the WPAC to ensure that the measures necessary to achieve our objectives are implemented in an efficient, effective and co-ordinated way. A National Technical Implementation Group (NTIG) co-ordinates ongoing detailed tracking of implementation and provides a forum for knowledge sharing. Finally, the regional local authority structures, with 5 regional committees, drive delivery of supporting measures at local level. This work was further supported by LAWCO. In operating within these structures, all of the bodies associated with this Plan will endeavour to adopt an ethos of actively participating and working together to deliver real action and positive outcomes.

Under the WFD, the Republic of Ireland and Northern Ireland are required to co-ordinate their efforts in relation to the two international river basin districts. During this cycle, the North South Water Framework Directive Coordination Group will continue to oversee the ongoing co-ordination between the authorities in this regard. Depending on the outcome of negotiations relating to the withdrawal of the United Kingdom from the European Union, under Article 50 of the Lisbon Treaty, the co-ordinating arrangements may need to be reviewed and revised to take account of the changed circumstances.

Communication and Public & Stakeholder Engagement

A clear message emerged from the public consultation processes around the need to improve communication and public and stakeholder engagement with regard to the implementation of the RBMP and indeed the broad integrated catchment approach. The concerns centred around facilitating (1) public and stakeholder engagement with national water policy and (2) public and stakeholder engagement at the regional and local level to contribute to delivery of the Plan itself.

To address the former, the Water Forum (An Fóram Uisce) has been established to facilitate stakeholder engagement on all water issues, including issues of water quality and implementation of the WFD. The Forum determines its own work programme and the means of communicating its views and analysis. However, its views feed into the proposed implementation structures at all levels, including the work of the WPAC.

LAWCO drives public engagement, participation, and consultation with communities and stakeholders at local level, and co-ordinates these activities across all 31 local authorities. LAWCO also works to ensure that public and stakeholder engagement will result in meaningful public and stakeholder participation in the catchment management approach across the RBD.

In addition, the EPA will continue to lead on networking and knowledge sharing. The WFD app and the catchments.ie website both act as information and data repositories and as knowledge-sharing tools to allow better targeting of measures and co-ordination of implementation.

We have ensured that communication and knowledge-sharing activities of both LAWCO and the EPA are integrated with the implementation structures and feed into policy development and the implementation of this Plan.

Expected Outcomes

Based on the information set out in the Plan, it is expected to achieve the following over the period to 2021:

- Investment in urban waste-water treatment will initiate projects in 255 urban areas, achieving water quality improvements and compliance with the requirements of the Urban Waste Water Treatment Directive. Drainage area plans will be prepared for 44 urban areas.
- A total of 353 public drinking-water-source risk assessments will be prepared. Furthermore, 53 water supplies with pesticide exceedances will be investigated and, where necessary, follow-up action will be taken to prevent further exceedances.
- Irish Water will aim to achieve sustainable and efficient use of water by addressing (1) the high level of network leakage and unaccounted for water (45% of all water entering the supply network), and (2) the very high level of water use at the top end of the domestic usage range. Up to 2021, €73 million will be invested *per annum* to reduce water leakage by 61 million m^3 per year. This will reduce the leakage rate from 45% down to 38% initially by 2021, based on 2017 figures.
- A register of water abstractions will be established in Quarter 2, 2018. A water-abstractions authorisation system will be established by early 2019.
- The new strengthened NAP will continue to provide a good environmental baseline for the agriculture sector. Up to 6,000 farm inspections *per annum* will be carried out by local authorities and the DAFM.
- The new Sustainability Support and Advisory Programme will be jointly resourced by the DAFM, the dairy cooperatives and the DHPLG. It will consist of 30 sustainability advisers: 20 based within Teagasc and 10 within the cooperatives.
- An increased focus on knowledge transfer aimed at driving behavioural change towards more sustainable farming practices will see up to 5,000 farmers receiving support from Teagasc through the new collaborative Sustainability Support and Advisory Programme. This support will focus on issues within 190 prioritised catchment Areas for Action. In addition, 18,000 dairy farmers will receive advice on sustainable farming practices under the Dairy Sustainability Initiative.
- The next National Inspection Plan for Domestic Waste-Water Treatment Systems (2018–2021) will drive improvements in the performance of systems, with over 4,000 inspections being carried out by local authorities over this period.
- Bord Na Móna is in the process of phasing out the extraction of peat for energy production by 2030. It expects to rehabilitate 9,000 ha. of cutaway bogs (covering 25 peatlands) by 2021 and will look to implement best-available mitigation measures to further reduce water-quality impacts caused by peat extraction while the phasing-out process is taking place.
- The delivery of guidance for planning authorities on physical planning and the WFD will contribute to the protection of waters from deterioration arising from inappropriate future development. Supporting technical guidance will also ensure that best environmental practice is applied where alterations to surface waters are undertaken. The OPW will continue to apply best practice when carrying out drainage maintenance works. Between 2018 and 2021, 8,000km of river channel will be maintained.
- In addition to the new LAWCO, regionally-based Local Authority Water Support and Advisory Teams will be put in place. These teams, which will consist of up to 43 personnel in total, will be involved in co-ordinating and promoting mitigation measures in the 190 Areas for Action.
- A Communities Water Development Fund will be established to support local community water initiatives with a particular focus on measures which are aligned with the priority actions in this Plan. The fund will be administered by LAWCO.
- A total of 190 Areas for Action have been prioritised nationally for particular attention during this cycle (2018–2021). These include a total of 726 water bodies. Actions will involve multidisciplinary and cross-agency approaches.
- The interaction between the new water-governance structures, consisting of the five regional committees; the NCMC; the NTIG; the Water Forum; and the WPAC will be critical to the effective implementation of this Plan.
- On the basis of the above actions, it is expected that general water-quality improvements will be achieved in the 726 water bodies prioritised for this planning cycle (2018–2021). However, given the complexities involved and the known difficulty

in achieving status improvements due to time lags in natural recovery and the interaction between multiple environmental pressures on water bodies, it is conservatively estimated that the actions outlined above will likely result in some 152 additional water bodies showing improvement in status by 2021, with further improvements being made thereafter.

- The remaining *At Risk* water bodies which fall outside the 190 Areas for Action will still benefit from existing and newly introduced measures. As resources allow these will be targeted for investigative assessments and further action, where necessary, through the prioritisation processes at regional committee level.

Summary of new policy measures influenced by public consultation feedback

Theme	Policy Measure	Section
State Responses to Improve Water Management	Development of new coordinating, governance and delivery structures	10
	Establishment of enhanced forums for public engagement	11
	€73 million per year invested by Irish Water on interventions to reduce leakage, including pressure-management, leakage-control measures, water-mains renewals and continued customer-side savings	9.7
Pressures on Water Bodies & Water Quality	Irish Water to spend €1.7 billion on 255 urban waste-water projects	7.2
	43 local authority staff to carry out investigative assessments on water bodies	10
	Agricultural Sustainability Support and Advisory Programme – 30 new Sustainability Advisors providing advice and support to farmers in the 190 Areas for Action and across the dairy sector	7.1
	New collaborative approach to drinking water source protection	8.1
	Expansion of grant scheme to assist with costs of septic tank remediation in high-status water areas and areas of protection	7.1
	Forestry-related regulations, policies and requirements have been realigned with national water policy	7.3
Physical Condition of Surface Waters	Inland Fisheries Ireland to assess barriers to fish movement in Water Bodies	7.6
	Publication of legislation to develop a register of abstractions and control system	7.7
	Development of water and planning guidance for Planning Authorities	7.8
	Improvement of hydromorphological assessment methods	7.6
Value of Water Bodies	LAWCO engagement at community level, including *"Blue Dot Catchments Programme"*	8.3, 11
	Development of new Community Water Development Fund	11.3
	Establishment of The Water Forum / An Fóram Uisce	11.1
	New collaborative initiatives for the protection of drinking water sources	8.1

Expected Outcomes

255	Urban waste-water treatment projects progressed
€73m	Invested to reduce water leakage by 61million m^3 *per annum*. Reduce leakage from 45% - 38%
30	Sustainability advisors in place to deliver the Agricultural Sustainability Support and Advisory Programme
43	Technical personnel deployed to regionally-based Local Authorities Water Support and Advisory Teams
23,000	Farmers will receive sustainability advice under the Dairy Sustainability Initiative and the Agricultural Sustainability Support and Advisory Programme
4,000	Inspections under the National Inspection Plan for Domestic Waste Water Treatment Systems
3,000+	Water abstractions registered and an authorisation system implemented
	Guidance for planning authorities on physical planning and the Water Framework Directive
726	Water bodies to achieve general water quality improvements
152	Water bodies to experience improved water quality status

Section 1: Introduction and Background

Water is essential for life. Humans need water for drinking and for food preparation, and it supports the plants and animals that form our natural environment. Of course, water is also critical to our economy, generating and sustaining wealth through such activities as agriculture, commercial fishing, power generation, industry, transport and tourism. However, water is a fragile resource that needs to be protected. Waters must be of sufficient quantity and satisfactory quality to protect our aquatic environment and its beneficial. Under the EU's Water Framework Directive (WFD), the Minister for Housing, Planning and Local Government has a leading role in developing and implementing policies to protect our water. Addressing the challenges we face also requires collective action, however. River basin management planning requires a considerable amount of technical expertise, but it also requires the knowledge and perspectives of people who use water in their everyday lives for drinking, fishing, swimming, farming and manufacturing or power generation. We must also remember that water is valued in itself and has an intrinsic aesthetic appeal. Essentially, water is a fundamental aspect of our lives, and river basin planning can help to ensure that we have a healthy water environment for all.

The approach that has guided the development of the *River Basin Management Plan* (RBMP) has changed substantially over time, as have ideas about implementation and the structures that will underpin successful outcomes. A clear focus on implementation and improved engagement with all sectors of society has been identified as essential to successful implementation. Moreover, it is clear that all stakeholders need to engage at national, regional and local levels, and the analysis we require to support action nationally and at local water-body scale has been carried out. A substantial effort is also being made to engage communities in valuing their local waters and taking action to improve them.

This focus on participation and local engagement has led to the creation of the Water Forum (An Fóram Uisce), the Local Authority Water and Communities Office and the catchments.ie and watersandcommunities.ie websites. This RBMP also contains initiatives to develop better national dialogue on the value of water to us all. A new approach to implementation known as "integrated catchment management" is being used to support the development and implementation of the RBMP, using the catchment (an area that contributes water to a river and its tributaries, with all the water ultimately running off to a single outlet) as the means to bring together all public bodies, communities and businesses.

This second-cycle RBMP sets out the proposed framework for ensuring that Ireland's water environment is protected and improved, in line with the objectives of the WFD. The first-cycle RBMP covered the period 2009–2015. Due to delays in developing this second cycle, this Plan covers the period 2018–2021. A third-cycle Plan will be required for 2022–2027.

This RBMP assesses the quality of water in Ireland and presents detailed scientific characterisation of our water bodies. The characterisation process also takes into account wider water-quality considerations, such as the special water-quality requirements of protected areas. The characterisation process identifies those water bodies that are *At Risk* of not meeting the objectives of the WFD, and the process also identifies the significant pressures causing this risk. Based on an assessment of risk and pressures, a programme of measures has been developed to address the identified pressures and work towards achieving the required objectives for water quality and protected areas. The process whereby the Plan and the associated programme of measures will be implemented is set out below, along with a discussion of the expected outcomes of these actions.

1.1 Second-Cycle River Basin Management Plan in Context

The objective of the WFD, and of this process of river basin management planning, is to ensure that the required water-quality improvements are achieved through a catchment-based approach to water management, through a co-ordinated approach by stakeholders across the water sector and through meaningful public engagement and participation in the development and implementation of plans.

The first cycle of river basin management planning, which covered the period 2009–2015, developed plans and associated programmes of measures on the basis of four River Basin Districts (RBDs) within the Republic of Ireland, and a further three international RBDs (which cut across Northern Ireland and the Republic of Ireland). These plans set ambitious targets, which envisaged that the majority of water bodies would achieve good status by 2015.

This second-cycle Plan aims to build on the positive aspects of the first cycle, and also to learn from those aspects which did not progress as well as they had been expected to do. In this regard, Section 3 considers the first cycle in some detail. However, in terms of providing a context for this Plan, the following three key lessons have emerged, partly through the public consultation processes that have been put in place.

Firstly, the structure of multiple RBDs did not prove effective, either in developing the plans, or in implementing them. It is now apparent that a single River Basin structure is a more sensible way of ensuring that resources are used efficiently and that the similar challenges faced across the country are addressed in a coherent way.

Secondly, and related to the above, governance and delivery structures in place for the first cycle were not as effective as expected. Due in part to the number of RBDs, the delivery arrangements were overly complex. In particular, the level of oversight of programme delivery and ongoing review was weak. Although national measures have generally been implemented effectively, one could argue that the importance of local delivery for many measures was not well understood when the first-cycle Plans were being developed, or more importantly, when the implementation of the Plans was being considered. These issues have been taken into account in the revised implementation structures set out in this Plan.

Thirdly, the targets set in the first cycle were not realistic. These targets were set at a time when the concept of river basin management planning was new both to EU member states and within an Irish context, before the economic downturn's impact on the capacity to deliver such targets was clear. Another issue was that the level of ambition was not necessarily grounded on a sufficiently well-developed evidence base. A central aspect of the work in developing this second cycle RBMP has been to ensure that the evidence base upon which to make decisions is better developed, and that the targets set in the Plan are achievable.

To develop this improved evidence base, the EPA has been carrying out catchment characterisation work to assess the risk status of our water bodies. In line with the WFD requirements, this catchment characterisation work identified the status of our water bodies, assessed the water bodies *At Risk* of not achieving the requirements of the Directive and identified the significant pressures on these *At Risk* water bodies. The process also identified our protected areas, considered what compliance with the requirements would mean in these areas and presented the issues to be addressed for those protected areas not currently compliant with the requirements.

The improved evidence base which has emerged from this EPA characterisation work gives us a better picture of the current situation with regard to the water environment. It also allows for an evidence-based assessment of what improvements are achievable at both national and local levels in the period 2018–2021 and beyond. The evidence base will be further developed over the course of this Plan.

In line with these three key lessons, three essential principles have guided the development of this RBMP. Firstly, the development and implementation of this Plan requires effective and efficient national, regional and local structures — and proper integration of these structures. Secondly, the targets set in this Plan must be based on sound evidence and be ambitious but achievable. Thirdly, we must continue to ensure that effective national measures are in place to address pressures on the water environment. Where current measures have been found insufficient, the delivery of additional measures has been prioritised to ensure the implementation of "the right measures in the right place".

1.2 The Irish River Basin District

For this second cycle, a single national River Basin District has been defined. The Irish River Basin District covers an area of 70,273km^2. This has been broken down into 46 catchment management units. These units are, in the main, based on the hydrometric areas in use by authorities — with, for example, the River Shannon being sub-divided on the basis of the catchments of its major tributaries. The 46 catchment management units have been broken down further into 583 sub-catchments. These 583 sub-catchments contain a total of 4,829 water bodies. The number of water bodies in each sub-catchment ranges from 3 to 15.

Within the River Basin District (RBD), there are 140 designated bathing waters, 64 shellfish waters, 42 nutrient-sensitive areas, 358 special areas of conservation (SACs) with water dependency and 154 special-protection areas (SPAs). The SACs are geographically quite concentrated, in particular along the western seaboard. Related to this, the water bodies which are at, or are required to be at, high-status are similarly concentrated — with a significant overlap between high-status waters and the SACs with water dependency. The SPAs are to some extent more dispersed, but they are also found in particular concentrations along the western seaboard.

Figure 1.1 - The Irish River Basin District for the second cycle RBMP

The most recent Census data, from April 2016, shows that the Irish River Basin District has a population of around 4.75 million people. Population distributions from the previous census show that 24% of the total population of the State live in Dublin City and suburbs, representing the major population centre and accounting for 1.1 million people. There are four other major cities — Cork, Limerick, Galway and Waterford – with populations ranging from 200,000 in Cork City to 52,000 in Waterford. A total of 39 towns, with populations ranging from 10,000 to 40,000, account for a further 730,000 people, or 16% of the total population. The table below sets out the populations in major settlement types based on the 2016 population figures and the 2011 distribution statistics.

Settlement Category	Number of Settlements	Share of population (%)	Estimated Population
Dublin City and suburbs	1	24	1,141,914
Other major cities	4	9	428,218
Towns 10,000 to 40,000	41	16	761,276
Towns 5,000 to 9,999	41	6	285,479
Towns 1,500 to 4,999	82	6	285,479
Remainder of country	n/a	38	1,808,031
Total population of RBD	**n/a**	**100**	**4,757,976**

Table 1.1 - Population and settlement patterns in the Irish River Basin District

A key feature of the River Basin District (RBD) stems from Ireland's comparatively large rural population — with 38% of the population, or 1.74m people, living in rural areas. The high proportion (as compared to other European countries) of the population living in rural areas presents some specific characteristics; for example, around 30% of dwellings have waste-water systems other than connection to public waste-water treatment. Similarly, almost 20% of dwellings have drinking water supplies other than those obtained from public water schemes.

Nationally, the economy is characterised by a strong focus on exports — with the total value of exports in 2015 standing at around €112 billion. Key export sectors include medicinal and pharmaceutical products (€30 billion), organic chemicals (€21 billion) and the broad food, agriculture and beverage sector (€11 billion). However, economic outputs and the drivers of economic growth across the RBD are diverse — and the spatial patterns of economic output reflect the settlement patterns outlined above. This is demonstrated by the regional variation in the relative importance of agriculture — with a high proportion (over 12%) of those employed in the Border region working in the agriculture sector, compared to 4% in the Mid-East region and virtually 0% in the Dublin region.

Now that some context for this Plan has been provided, along with a brief outline of the characteristics of this River Basin District, the next section will outline the approach taken in developing this second cycle RBMP, including the methodology applied and the structures put in place to steer the development of this RBMP.

Section 2: Developing the River Basin Management Plan

In developing the *River Basin Management Plan* (RBMP), a three-tier implementation structure across relevant authorities was adopted, following initial public consultation. At Tier 1, the Minister for Housing, Planning and Local Government has responsibility for policy, necessary legislation and resourcing of the Plan. Tier 2 is led by the Environmental Protection Agency (EPA), which is responsible for the catchment characterisation process and for assisting and advising the Minister. Tier 3 consists of the co-ordinating local authorities, which have responsibility for implementation of measures on the ground. These local authorities will have the detailed knowledge required for successful delivery of many potential measures at local level.

This tiered structure for development of the Plan was co-ordinated through both the statutory Water Policy Advisory Committee (WPAC) and a Programme of Measures (POMs) Steering Group. The former provided high-level policy direction, while members of the latter, having considered the detailed technical, scientific and policy information, collaborated to arrive at a Programme of Measures for the second cycle. The detailed technical and scientific information upon which the member of the POMs Steering Group depended for their work was developed over the past two years by the EPA in conjunction with local authorities and other public bodies. The catchment assessments have been completed nationally for the second plan. The assessments will be refined further as additional information is gathered at a local level during the second cycle (2018–2021).

It is important to note that the approach guiding the development of the RBMP has also been informed and assisted by an extensive process of public consultation. The implementation plans and structures outlined in Section 2 build on this co-ordinated, tiered approach to delivery of the Plan, and on the public-engagement processes and tools that have been developed and used in delivering the RBMP.

2.1 Approach to Developing the Plan

The approach that guided the development of the RBMP is set out in the following points. (The structure of the Plan closely follows this outline.)

- The outcomes of the first planning cycle were assessed. This part of the process included public consultation on significant water-management issues in Ireland.
- Characterisation of the RBD was undertaken. This included an assessment of the current status of our waters and the identification of water bodies currently At Risk of not meeting WFD requirements.
- The significant pressures and impacts of human activities were identified and summarised.
- Our protected areas and high-status waters were identified, mapped and characterised.
- Ireland's monitoring network was reviewed, revised and mapped.
- Environmental objectives were identified, and priorities were established.
- A high-level economic analysis of water usage was completed.
- A programme of measures based on the characterisation process, and on the pressures identified, was set out. This programme of measures aims to meet the environmental objectives and specific requirements of the WFD.
- The proposed implementation structures for this Plan were set out.
- The expected positive outcomes of the RBMP were identified.
- Plans for ongoing monitoring and reporting on implementation were put in place.
- A Strategic Environmental Assessment and an Appropriate Assessment of the Plan were carried out.
- A draft RBMP, which set out the proposed measures to achieve the plan objectives, was published.
- There was extensive public consultation on the draft Plan, both *via* written submissions sent to the Department and *via* an extensive local public-consultation process undertaken by the Local Authority Waters and Communities Office (LAWCO) (set out below in Section 2.2). Bilateral discussions were also held with key stakeholders.
- An updated Programme of Measures was developed. This was influenced and informed by the feedback received.

The above points show the detailed methodology followed in order to arrive at this Plan. The next sections outline three of the key supporting structures for development of the Plan (1) the WPAC (2) the POMs Steering Group and (3) the Public Consultation processes.

2.2 Supporting Structures for Development of the River Basin Management Plan

2.2.1 Water Policy Advisory Committee

The WPAC was established (under S.I. No. 350 of 2014) to support and advise the Minister on the development of the RBMP. This high-level policy committee, which meets on a quarterly basis, brings together the key national organisations that contribute to delivery of the WFD in Ireland. The WPAC is chaired by a representative of the Minister for Housing, Planning and Local Government, and consists of representatives from the following organisations:

- Department of Housing, Planning and Local Government (DHPLG)
- Department of Agriculture, Food and the Marine (DAFM)
- Department of Communications, Climate Action and the Environment (DCCAE)
- Department of Culture, Heritage and the Gaeltacht (DCHG)
- Department of Health
- Commission for Regulation of Utilities
- Local authorities
- EPA
- Irish Water
- Inland Fisheries Ireland (IFI)
- Office of Public Works (OPW)
- Geological Survey of Ireland

The WPAC was further supported by the members of the POMs Steering Group, who oversaw development of the POMs and of the draft and final plans.

2.2.2 Programme of Measures Steering Group

The role of the POMs Steering Group was to consider in detail the EPA characterisation work, the outcome of the public consultation process and the implications of wider public policy concerns — and to steer the development of a Programme of Measures that would effectively address the significant pressures that were identified during the characterisation work. The POMs Steering Group consisted of members of the following organisations:

- DHPLG
- DAFM
- EPA
- LAWCO
- Irish Water
- Teagasc

In carrying out its work, the POMs Steering Group considered the outputs of the characterisation work and a number of working papers on related water-quality issues. In addition to the organisations listed above, other key stakeholders and actors — such as the Department of Communications, Climate Action and the Environment (DCCAE); IFI; and the National Parks and Wildlife Services (NPWS) of the Department of Culture, Heritage and the Gaeltacht (DCHG) and the OPW — were engaged with throughout the process of developing this Plan. The members of the POMs Steering Group, and the other key stakeholders, were also engaged with in a wider sense throughout the catchment characterisation work. These additional engagements took place, for example, through bilateral meetings and existing working groups.

2.3 Links to other Government Policies and Plans

An important part of developing the RBMP has been to identify and understand the links to other policy areas across government, and the key plans and programmes either currently in place or planned. This has been greatly informed by the Strategic Environmental Assessment (SEA) process, which details the plans and programmes that interact with and influence the river basin management planning process. The relevant policy areas include land use and spatial planning, climate change, flooding protection, water services policy, waste management, agriculture, fisheries, forestry and peatlands.

For these, and indeed other relevant policy areas, the existing policy, plans, strategies and programmes have fed into the development of this RBMP. This has been particularly important in such areas as planning, agriculture, forestry and peatlands, where new strategies have recently been adopted. Further information is contained in Section 2.6.

2.4 Public Consultation Processes

Since the process of developing the second-cycle RBMP commenced in 2014, public participation and stakeholder engagement have been among its core drivers, and they have shaped the priorities for the forthcoming cycle to 2021, and beyond. In Section 6, this Plan sets out environmental objectives which were judged to be ambitious but achievable. The participation of all stakeholders — and of the general public, in particular — in both the development and implementation stages will be crucial to achieving many of these objectives.

As acknowledged in Section 1.1 of the Plan, one of the key lessons from the first-cycle Plan is that the governance and delivery structures were not as effective as expected in achieving environmental objectives at both national and local levels. Enhanced public consultation structures were needed to:

- Build awareness of water quality issues and water management in Ireland.
- Garner views on the water-related issues which are important to people.
- Ascertain public opinion on water policy in general, and the proposed RBMP actions in particular.
- Give citizens and representative organisations input into the policy-making process.
- Ensure that national policies and measures are supported by effective local implementation.
- Benefit from community input on the prioritisation of supplementary measures.
- Encourage and enable community-led water initiatives.

An important facet of the development of the RBMP, therefore, was comprehensive public consultation. Three public consultation processes were held in respect of the Plan:

- The Significant Water Management Issues consultation, which is mandated under the Water Framework Directive (WFD), was held in 2015/2016. This process identified significant issues to be addressed in the draft RBMP.

- National public consultation on the draft RBMP took place in 2017. This allowed people to give their views on the structures and measures set out in the draft document, and on how the final Plan should be developed.
- Local public consultation on the draft RBMP took place in 2017. This process ran concurrently with the national consultation process and was focused on local water-quality interests and issues. It was organised by LAWCO and centred around 124 public information meetings held across the country.

These processes are set out in more detail below.

2.4.1 Significant Water Management Issues Consultation

A public consultation on Significant Water Management Issues (SWMI) took place from June 2015 to December 2015, commencing with a workshop in which all stakeholders were invited to participate. Arising out of this consultation, a number of common themes were identified, covering both environmental pressures and societal factors. These themes were outlined previously in the draft Plan[1]. A strong correlation is apparent between the issues raised through the SWMI process and the main themes that arose during the public consultation on the draft Plan.

A total of 46 responses to the SWMI consultation were received, and the key issues raised were included in the draft Plan, published in early 2017. Some of these key issues included:

- The need for more strategic and co-ordinated approaches to communication, public engagement and stakeholder engagement.
- The relative balance between full characterisation and associated risk assessment, and the need for prioritisation and implementation of measures.
- The importance of the agriculture sector (and, indeed, of all sectors) in terms of contributing to water-quality improvements.
- The importance of achieving sustained investment and operational improvements for waste-water treatment plants.
- The need to specifically address the loss of high-status waters.

Related to this SWMI consultation, the DHPLG held a one-day workshop in May 2016 to further examine and develop the issues arising from consultation and to reach a common understanding with those who responded in this process.

2.4.2 Direct Public Consultation on the Draft River Basin Management Plan

On 28th February 2017, the Minister for Housing, Planning and Local Government published the draft RBMP for Ireland 2018–2021 and invited submissions, observations and comments on the proposed Plan during a six-month public consultation process. A number of media were provided to give people the opportunity to get involved and have their say on how the Plan should be developed. Submissions were received by email, by post and by means of a short online survey.

There was a strong response to the process, with 938 submissions received directly by the Department from private individuals and groups. These groups included environmental organisations, community organisations, local authorities, political representatives and companies. The Water Forum (An Fóram Uisce) brought together the views of many stakeholders with an interest in water and, following intensive discussion and deliberations, submitted a comprehensive document as part of this process. An analysis of all submissions identified 22 sub-themes as being of importance to the public. Many of these sub-themes are inherently linked, and further grouping them together allowed four high-level themes to emerge: “State Responses to Improve Water Management”, “Pressures on Water Bodies and Water Quality”, “Physical Condition of Surface Waters” and “Value of Water Bodies”. These are shown as headings in the following table.

1 Available on the DHPLG website at: http://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_river_basin_management_plan_1.pdf

More Frequently Raised	State Responses to Improve Water Management	Pressures on Water bodies and Water Quality	Physical Condition of Surface Waters	Value of Water Bodies
	Policy Issues, Regulation and Enforcement	Agricultural Practices	Biodiversity Management	Water & Health
	Organisational Coordination	Nutrient Enrichment	Flooding	Education
	Public Engagement	Forestry	Abstraction & Flow	Recreation
	Co-ordination of Plan Implementation	Hazardous Chemicals	Physical Elements	High-Status Waters
Less Frequently Raised	Resourcing &Prioritisation	Invasive Species	Hydromorphology	
	Level of Ambition	Climate	Land-Use Planning	

Table 2.1 - Issues articulated during RBMP consultation process

2.4.3 Local Public Consultation via Local Authority Waters and Communities Office

An additional forum was provided through the public engagement processes undertaken by LAWCO. A primary focus of LAWCO has been to engage with communities throughout the country, bringing the message of the importance of water quality, listening to community concerns and encouraging communities to get involved in water-related matters. Through face-to-face engagement at 120 public information meetings, and via online submissions and phone conversations, LAWCO officers gathered over 1,000 submissions from people interested in both national and local issues.

These engagement processes provided an important means both of conveying information to the public and of gathering public opinion on local issues and the draft Plan. The sub-themes identified are set out in the table below (Table 2.2). Although more local in nature, they generally align with the themes set out in the direct consultation.

More Frequently Raised	State Responses to Improve Water Management	Pressures on Water Bodies & Water Quality	Physical Condition of Surface Waters	Value of Water Bodies
	Prioritisation of (Local) Urban Waste-Water Treatment Plants	Agriculture	Physical Modification	Concerns over Access/walks etc.
	Drinking-Water Treatment	Dumping	Abstractions/ Diversion	Impacts on Bathing Water Quality
	Fragmentation of State Actors and their Roles (clarity of responsibilities, contactability, response)	Forestry	Siltation (origins may be on land)	Recreation
		Industry	Biodiversity	
Less Frequently Raised		Domestic Waste-Water Treatment Systems		

Table 2.2 - Issues articulated during the LAWCO consultation process

2.5 Influence of Consultation on the Plan

The individual comments, sub-themes and themes outlined above have been assessed, and harnessed to shape existing or potential measures, and to set environmental objectives which ensure that specific concerns are being addressed as much as possible. Of course, this is not achievable for all comments in all submissions, but we have endeavoured to maximise the impact of the consultation process on the Plan, within the scope of the WFD and the resources available to implement the Plan. Some of the new policies that were influenced by public consultation feedback are summarised in Table 2.3 below, together with references to where they are detailed in the Plan.

Figure 2.1 - Summary of new policy measures influenced by public consultation process

State Responses to Improve Water Management

The establishment of a number of new forums for engagement in water-related matters is a response to the issues raised initially in the SWMI consultation, and reinforced strongly during the later public-consultation phases. From the National Technical Implementation Group to the An Fóram Uisce, stakeholders from all sectors have had an opportunity to engage with and shape the management of our water resources. During the public consultation, the themes of "Policy Issues, Regulation and Enforcement", "Organisational Co-ordination", "Public Engagement" and "Co-ordination of Plan Implementation" were raised consistently, being referenced in the majority of all submissions to LAWCO and in over 40% of Departmental submissions. These represented 4 of the 6 most common themes across all such submissions to the Department.

It is clear that there is an appetite among the general public for consistent, meaningful engagement with the river basin management planning process. The new implementation and engagement structures, along with the excellent work being undertaken by LAWCO at a local level, have provided the platform on which to engage with and influence the development of this Plan. These improvements, together with the devolution of more responsibility to the local authority Regional Committees, have paved the way for more pronounced improvements in water quality at a local level. The shift towards a more balanced strategy involving both locally led measures and national-level measures was made in response to a consistent message heard throughout the consultation processes. Although national measures are integral to the success of the Plan, the identification and implementation of the "right measure in the right place" is a key driver in shaping the way we protect our water bodies.

Pressures on Water Bodies and Water Quality

Rural diffuse pollution from agricultural sources has been identified by the EPA as a significant pressure in 780 (53%) of the water bodies that are At Risk of not achieving their environmental objective. To date, most of the existing measures to protect water bodies from rural diffuse pollution have been established at a national level (e.g. NAP, RDP). The need for improvements from more locally led, targeted measures has been identified through the catchment characterisation work of the EPA and is borne out in the submissions received during the consultation phase. Of the Departmental submissions received, 780 (41%) identified agricultural practices as being of concern, and agriculture was the second most frequently occurring theme in the LAWCO consultation process. Commonly raised issues included lack of resources for engaging with farmers; the need to strengthen the programme of practical, evidence-based measures; and the potential impact of the Food Wise 2025 expansion strategy on water quality.

The Plan includes a number of measures that address the various concerns in relation to nutrient enrichment from agricultural practices, especially at a local level. Some key commitments are:

1. The assignment of up to 43 regional local-authority staff to engage in investigative assessments at water-body scale to determine the precise causes of pollution. This assessment is not focused solely on agriculture.
2. The provision of the 30 new Agricultural Sustainability Advisers through the Agricultural Sustainability Support and Advisory programme, the specific remit of which is to provide farmers with advice and support that will enable them to contribute to the protection and enhancement of water quality.
3. The creation of a new collaborative approach to drinking-water source protection to effectively manage and protect drinking-water sources *At Risk* from activities in the catchment area.
4. The extension of the grant scheme for repairs, upgrades and replacement of domestic waste-water treatment systems in river catchments with a high-status objective.

Physical Condition of Surface Waters

Issues around flooding and flood protection measures and around controls on water flows and abstractions — and around how these relate to planning and development — were consistently raised throughout the submissions received during consultation. This was an area that was perceived to be weak in the first cycle. The draft Plan, published by the Minister in February 2017, included a number of new measures designed to promote better understanding of the physical condition of our water bodies, and to improve the management of activities impacting on the physical condition of surface waters into the future. The physical condition of water bodies is one of the most interrelated aspects of this Plan, as it can be significantly impacted by flood-relief schemes and arterial drainage maintenance, by barriers to fish migration, by such industries as forestry and peat extraction and by land-use planning.

Recognising the importance to the general public of managing activities that can impact on the physical condition of water bodies, we have proceeded to initiate a number of the critical measures that will drive the improvements in physical status of our water bodies and better integrate them into our decision-making processes. These include:

- Commencing the development of water and planning guidance for Planning Authorities; planners will be provided with training regarding the WFD and the environmental objectives set out in the Plan.
- Securing a commitment from IFI to immediately commence their assessment of physical barriers to fish movement in water bodies across Ireland. The project will pick up on initial work undertaken by IFI and through research projects and will result in a much better understanding of the scale of the issue to be dealt with under the third-cycle RBMP.
- Publishing legislation to develop a register of abstractions greater than 25m^3/day. This legislation gives responsibility to the EPA to manage a register of abstractions and requires all abstractors above the threshold to submit their details for retention on the register.
- Improving hydromorphological assessment methods. A programme of work led by the EPA is developing the ecological evidence base to identify the physical conditions necessary to support good and high ecological status. This evidence base will facilitate the design of improved mitigation measures which may be included in plans aimed at protecting against deterioration in ecological status. Supporting technical guidance regarding mitigation measures will reflect best available knowledge and practices in mitigating the ecological impacts of physical development in the vicinity of surface waters.

The implementation of these measures — along with others, such as abstractions and land-use planning — in order to address physical pressures demonstrates our continuing commitment to building our knowledge base and to improving our control over the physical processes that can impact on a water body's achievement of its environmental objectives. This firm commitment is also evident in the publication of extensive flood risk-management plans prepared by the OPW.

Value of Water Bodies

The responses received during the direct and local consultation processes reflect the heightened value that people place on our rivers, lakes and TRAC waters[2]. This was particularly evident in private submissions and in submissions from eNGOs. A number of new developments are intended to drive local engagement with the Plan and to build a sense of ownership within communities in relation to their local water bodies.

These developments are in the form of new governance and delivery structures set out in the Plan and of measures that have been included to achieve environmental objectives. The work undertaken by LAWCO will look to build on these during the second-cycle Plan, working alongside other resources from within local authorities and the Agricultural Sustainability Advisers. The engagement between these actors and various sectors of the community will seek to improve the public perception of Ireland's water bodies. This may be achieved by providing increased protection from pollution, for example, or by developing additional remediation projects.

Respondents were supportive of the LAWCO structure and the move to increased recognition of the role of communities. In response, a new Community Water Development Fund has been developed by the DHPLG. This fund will encourage and enable community-based projects which align with the goals of the RBMP.

The issues of healthy waters and the loss of our high-status waters were common themes in the submissions received. In keeping with the practical approach adopted by the local authority Regional Committees when prioritising areas for action, taking action in the sources of water bodies is seen as a commonsense and practical approach to achieving environmental objectives along the length of river channels. The *"Blue Dot Catchments Programme"* aims to protect and enhance high-status waters, many of which are located in headwaters in upland areas. This programme should have multiple benefits, including awareness-building and education regarding pressures, the initiation of small-scale projects within communities and the improvement of water quality and biodiversity.

From the outset, this Plan has consistently been shaped by a variety of factors, including the inputs of stakeholders as well as government policy and economic and societal factors. The initial SWMI consultation stage and the public consultation

2 Transitional and Coastal Waters

have clearly demonstrated that people across the island are interested in how we manage our waters and are keen to get involved at both local and national levels. Development of this Plan would not have been possible without the contributions of individual people, community groups, eNGOs, industry stakeholders, government bodies and others.

The implementation of the Plan over the next four years is equally important, however, and all stakeholders will have the opportunity to help shape the future direction of water-quality management in Ireland.

2.6 Environmental Assessment and the Plan

In accordance with European and national legislation, the DHPLG has undertaken a Strategic Environmental Assessment (SEA) and an Appropriate Assessment (AA) of the RBMP. These processes have informed the finalisation of the Plan.

2.6.1 Strategic Environmental Assessment

SEA in Ireland is governed by the European Communities Environmental Assessment of Certain Plans and Programmes Regulations (S.I. 435 of 2004 as amended by S.I. 200 of 2011). This requires that certain plans and programmes, prepared by statutory bodies, which are likely to have significant effects on the environment, be subject to the SEA process.

A screening of the need for an SEA to be carried out in relation to the RBMP was undertaken by the DHPLG in 2017, and it was determined that an SEA would be required. In recognition of this, the SEA process has been applied to the RBMP. The findings of the SEA, including proposed mitigation measures, have influenced the final RBMP. The SEA was ongoing throughout the development of the RBMP.

The objectives of the SEA process are to:

- Provide for a high level of protection of the environment
- Contribute to the integration of environmental considerations into the preparation and adoption of specified plans and programmes that are likely to have significant effects on the environment, with a view to promoting sustainable development

2.6.2 Appropriate Assessment

AA in Ireland is principally governed by the Birds and Natural Habitats Regulations 2011, as amended, and the Planning and Development Act 2000, as amended, which together transpose the requirements under Article 6 of the EU Habitats Directive.

The legislation places strict legal obligations on member states to ensure the protection, conservation and management of habitats and species of conservation interest in all European Sites. Article 6 of the Directive obliges member states to undertake an AA for any plan or project that may have a likely significant effect on any European Site. The outcomes of such AAs fundamentally affect the decisions that may lawfully be made by competent national authorities in relation to the approval of plans or projects.

The Habitats Directive has clear links to the WFD through the Register of Protected Areas, which includes Special Areas of Conservation (SAC) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (Directive 79/409/EEC as codified by Directive 2009/147/EC), collectively referred to as "European Sites". Article 6(3) establishes the requirement for an AA of plans and projects likely to affect such European Sites.

In compiling the RBMP, the DHPLG screened the Plan for AA in 2017 and concluded that a full AA would be required. As such a Natura Impact Statement (NIS) was prepared to further inform the AA of the RBMP. The DHPLG, as the competent authority for the RBMP, has concluded, on the basis of objective information, that the Plan, individually or in combination with other plans or projects, is not likely to have a significant effect on a European site. The AA was ongoing throughout the development of the RBMP.

The purpose of the AA process is to:

- Determine if a plan or project is likely to have a significant effect on a European site either individually or in combination with other plans or projects in view of the site's conservation objectives
- Only after having ascertained that it will not adversely affect the integrity of the site concerned can the project or plan proceed. Where it cannot be ascertained, alternatives must be considered

2.6.3 Integration of Environmental Considerations into the River Basin Management Plan

The SEA and AA processes were both ongoing in parallel to the Plan-making process. There were a number of opportunities where the two environmental processes influenced the development of the RBMP, and these are summarised below:

Identification of environmental constraints

As part of the SEA, an audit of baseline environmental conditions was undertaken with reference to biodiversity, flora and fauna, population, human health, food production and safety, soils and geology, water, air quality and climatic factors, material assets, cultural heritage and landscape. This information was used to focus the SEA objectives, to develop alternatives and to assess positive and negative impacts associated with the implementation of the RBMP.

Assessment of alternatives

The environmental baseline and objectives were used to identify key sensitivities and to inform development of the alternatives and ultimately the assessment of the preferred alternative. The SEA team and the Plan team liaised on possible alternatives during preparation of the SEA scoping document, which determines the extent of the assessment, and subsequently as the RBMP evolved through meetings and workshops.

Recommendation of mitigation measures to address impacts on the wider environment

Mitigation measures were proposed to address negative environmental impacts identified during the assessment process. These included amendments to the wording of actions in the Plan and the inclusion of new actions to protect the environment and human health.

Required environmental monitoring programme

An environmental monitoring programme to track progress towards achieving environmental objectives and reaching targets was presented in the SEA Environmental Report and has been integrated into the RBMP. This programme will facilitate the ongoing monitoring of the implementation of the RBMP.

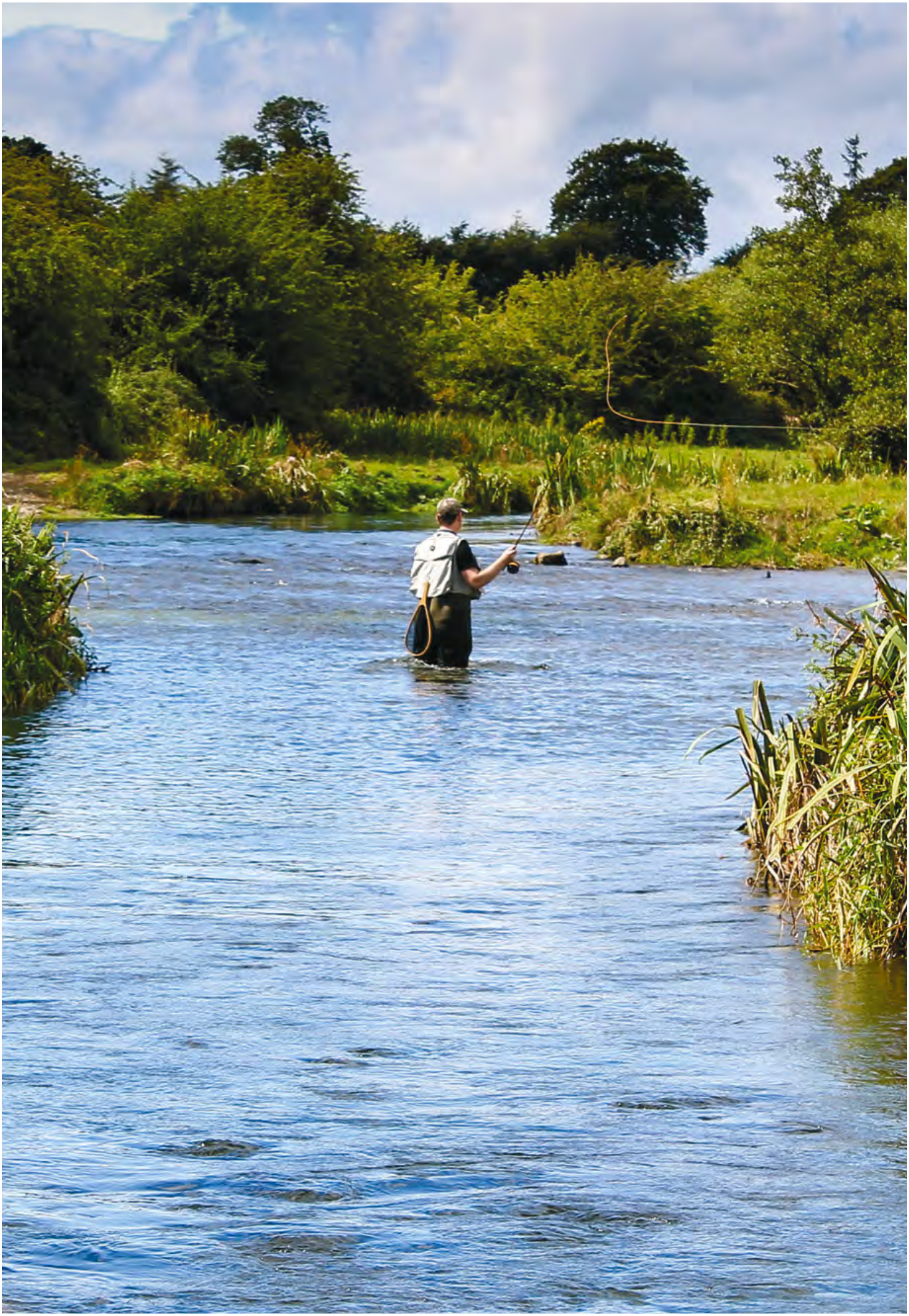
Consultation

To enable stakeholders to better understand the environmental implications of the RBMP, consultation on the SEA and AA was fully integrated with the consultation opportunities for the RBMP. In the first instance, this included SEA Scoping and AA Screening which ran in parallel to the SWMI consultation. Subsequent consultation on the draft RBMP ran in parallel with consultation on the SEA Environmental Report and the NIS. Issues raised on all documents were considered by the wider team to ensure a full understanding of the cross-sectoral issues for the Plan and the receiving environment.

2.7 Conclusion

The DHPLG has learned from the river basin planning cycle the importance of a strong interface with citizens, communities and stakeholders. Thorough consultative processes have been undertaken, and their findings carefully considered. The conclusions have provided a strong base, upon which a suite of new structures, policies and measures have been created. The consultative structures now in place will ensure that the views of citizens and representative organisations continue to influence these endeavours.

Furthermore, the cross-agency collaborative approach to developing the RBMP will assist in ensuring that new strategies and plans in related policy areas are cognisant of water quality objectives and will, insofar as is possible, align with those objectives. Of particular importance in this regard are planning policy; future national climate-change mitigation and adaption plans; the future implementation of recently-developed flood risk management plans; and, finally, ensuring effective co-ordination between the requirements of the Floods Directive and the WFD. These topics will be covered in more detail later in this document.



Section 3: Review of the 1st Cycle — Measures Implemented and Outcomes

Key measures implemented during the first river basin management planning cycle included putting in place the legal frameworks for:

(i) Implementing the Water Framework Directive (WFD)

(ii) Establishing licensing regimes for urban waste-water discharges

(iii) Implementing the Good Agricultural Practice Regulations for the protection of waters

(iv) Putting in place a comprehensive water-quality monitoring programme and implementing the necessary actions in line with the legal frameworks established

These principal measures are outlined in this section. In addition, supplementary or supporting measures were also implemented, and some of these are also briefly outlined.

3.1 Key Measures Implemented to Support the Delivery of Environmental Objectives during the First Cycle of River Basin Management Plans

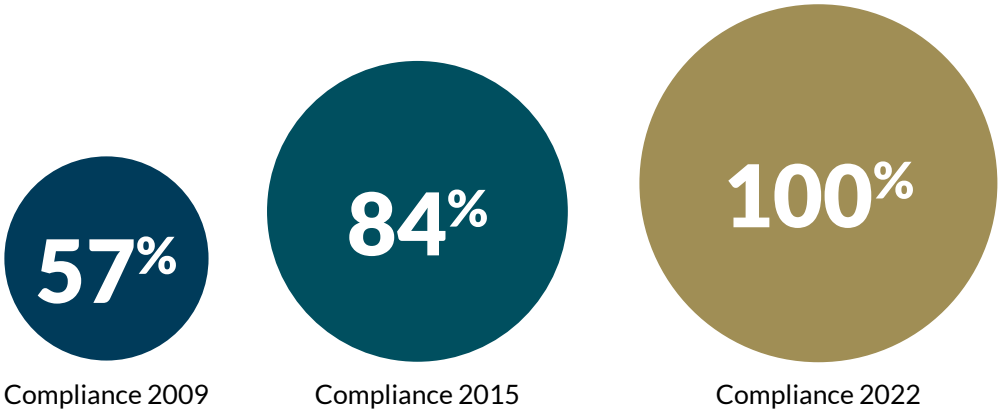


Figure 3.1 - Projected improvement in compliance with the Urban Waste Water Treatment Directive

3.1.1 Legal Framework for Water Framework Directive Implementation and Associated Actions

The European Communities Environmental Objectives (Surface Water) Regulations 2009 (S.I. 272 of 2009) and the European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. 9 of 2010) establish the legal framework needed to implement the environmental objectives of the WFD. They lay down the criteria and environmental quality standards for classifying water status and impose an obligation on public authorities to take the necessary steps to achieve the objectives set out in river basin management plans.

Both sets of Regulations, *inter alia*, require licensing authorities to examine, and where necessary, review discharge licences where these are needed to achieve the water-quality objectives as set out in river basin management plans.

3.1.2 Legal Framework for the Implementation of the Urban Waste Water Treatment Directive and Associated Actions

The Waste Water Discharge (Authorisation) Regulations 2007 (S.I. 684 of 2007) gives effect to the requirements of the Urban Waste Water Treatment Directive (Directive 91/271/EEC) and the Water Framework Directive (2000/60/EC) in Ireland. The Urban Waste Water Treatment Directive (UWWTD) lays down the requirements for the collection, treatment and discharge of urban waste-water and specifies the quality standards which must be met — based on agglomeration size — before treated waste-water is released into the environment.

The Enviromental Protection Agency (EPA) is responsible for licensing and regulating urban waste-water discharges. The authorisation process provides that the EPA must address the requirements of the UWWTD when granting a licence. Where necessary, the EPA must also specify a requirement for more stringent treatment — on the basis of the "combined approach" set out in Article 10 of the WFD — to address particular water-quality needs, such as protected area requirements (including bathing waters, shellfish waters or nutrient sensitive areas), or to address water-quality standards based on requirements or priorities established in River Basin Management Plans.

Discharges from urban areas with a population equivalent of 500 or more require a Waste Water Discharge Licence, and discharges in urban areas with populations below this threshold require a Certificate of Authorisation. The EPA commenced the licensing of urban urban areas in 2007 and had granted 505 Waste Water Discharge Licences and 538 Certificates of Authorisation[3] by the end of the first cycle. It is the responsibility of Irish Water to comply with the requirements of these licenses and authorisations.

There has been significant investment in urban waste-water infrastructure over the period of the first cycle, supporting the achievement of requirements set out in the Discharge Licences or Certificates of Authorisation. Detailed information on past and projected future expenditure on water infrastructure is set out in Section 9 of this RBMP. In the period to 2014, the main vehicle for investment in waste-water infrastructure was the Water Services Investment Programme of the Department of Housing, Planning and Local Government (DHPLG). For the period 2000–2013, a total of approximately €3.5 billion was allocated to the waste-water element of this capital-investment programme, with €1 billion of this amount expended over the period 2009–2013. This investment has yielded significant improvements in waste-water treatment over the period of the first cycle. For example, in 2009, 57% of urban areas complied with the relevant requirements of the UWWTD with regard to the provision of secondary treatment, whereas this had increased to 84% of urban areas in 2015.

Although real progress was made in the first cycle, it is recognised that significant further capital investment and operational improvements are required in order to fully address the requirements of the UWWTD and to progress towards meeting the objectives of the WFD. The setting up of Irish Water in 2014 represented an important development in this regard. Prior to 2014, water services in Ireland were delivered by 34 local authorities; this resulted in a fragmented approach to the delivery of water-services infrastructure, uncertainty about funding and underinvestment over many decades. Irish Water was set up as a single national water-services authority to address the identified shortfalls in water-services infrastructure and to provide the opportunity to take a long-term view of water services at a national level. The approach taken by the new authority is aimed at addressing funding shortfalls, ensuring that resources are strategically targeted towards priority investment needs and putting in place an approach to investment in water services that strikes the optimum balance between capital and operational spend — thus ensuring the required delivery of services over time at the minimum cost.

3 Urban Wastewater Treatment in 2015, EPA (2016) http://www.epa.ie/pubs/reports/water/wastewater/uwwreport2015.html

3.1.3 Legal Framework for Implementation of the Nitrates Directive and Associated Actions

The Nitrates Directive is the primary agricultural measure in place to support delivery of the WFD objectives. It aims to protect water against pollution caused by nitrates from agricultural sources. The Nitrates Directive was implemented in Ireland by the European Union (Good Agricultural Practice for the Protection of Waters) Regulations (S.I. No 605 of 2017). Because Ireland chose to designate the entire territory as subject to the Nitrates Directive, a basic level of protection was put in place for all water bodies throughout the country. The mandatory elements of the Good Agricultural Practice (GAP) Regulations, which are delivered through the Nitrates Action Programme, are:

- The setting of limits on farm stocking rates
- The introduction of legal limits on the application of nitrogen and phosphorus fertilisers
- The maintenance of buffer strips adjacent to watercourses where fertilisers cannot be spread
- The introduction of "closed periods" prohibiting the application of organic and chemical fertilisers during environmentally-vulnerable parts of the season
- The establishment of minimum storage requirements for livestock manures
- The introduction of specific requirements regarding the maintenance of green cover[4] in tillage lands
- The maintenance of records relating to stock, land use and fertilisers brought onto the farm

The Water Quality and Agriculture Working Group was set up to ensure co-ordinated implementation and information sharing. The Group continues to meet on a quarterly basis and consists of representatives of the DHPLG, the Department of Agriculture, Food and the Marine (DAFM), the EPA and local authorities.

Primary responsibility for enforcement lies with the local authorities under the auspices of the DHPLG. The inspection regime has been defined as follows:

- Local authorities are to undertake approximately 2,000 inspections each year on farms that have not previously been visited or that have not been inspected in a number of years
- Around 1,500 follow up visits are to take place annually where minor non-compliance has been identified, to ensure the problems are corrected. The DAFM has provided training to local authority staff to ensure that there is a consistent approach to inspections across the whole country
- In addition to these local authority inspections, the DAFM will carry out a further 3,000 farm inspections:
  - 1,650 relate to ensuring compliance with the Nitrates Regulations
  - 1,350 relate to cross compliance inspections
- Finally, the DAFM will carry out administrative checks for all farms with regard to the livestock-manure nitrogen limit laid down in the regulations

The level of inspection is summarised in the table below:

Inspection Authority	Annual Inspections (farms)	Other inspections (farms)	Stocking rate check[5]	Total on-farm inspections
Local Authorities	2,000	1,500		3,500
DAFM	3,000		139,000	3,000

Table 3.1 - Annual farm inspections in the Irish River Basin District

4 Green Cover is defined as a sown crop established with light soil cultivation after the harvesting of a cereal or other tillage crop. It mitigates the loss of soluble nutrients.

5 This is an administrative check on all farms to confirm that the organic nitrogen limit does not exceed the permitted limit.

Based on these inspections, compliance rates were almost 70% at the end of the first cycle — with the majority of non-compliance issues relating to management within the farmyard. This means that minor changes to farmyard management (cleaning up small spillages of silage, for example, or diverting clean water away from storage tanks) can increase compliance levels. These issues were identified in an information booklet sent to farmers by the DAFM in 2016, and future actions will aim to address this challenge. Furthermore, as the DAFM is the paying agency for EU CAP funds, problems found during inspections by local authorities or other Departments or agencies are cross-reported to the DAFM and may result in a monetary penalty for the farmer involved.

The Nitrates Directive provides for an increase in the general stocking limit of 170 kg N per hectare where a member state has agreed its Nitrates Action Programme with the EU Commission and can demonstrate compliance with specific conditions. The Nitrates Derogation is operated by the DAFM and is only available to grassland farms on an individual basis. The derogation is subject to strict conditions, including mandatory soil sampling, the preparation of a nutrient-management plan and the annual submission of fertiliser records. The number of approved derogations has grown from 4,133 in 2007 to over 7,000 in 2017. The DAFM carries out annual administrative checks on all derogation farms, and on-farm inspections on 5% of derogation farms. Levels of compliance on derogation farms are higher than on non-derogation farms and generally in the region of 85–90%.

Article 12 of Council Regulation (EC) No. 73/2009 requires member states to set up a Farm Advisory System (CC-FAS) to advise farmers on meeting cross-compliance requirements, including those set down by the Nitrates Directive. In keeping with this Regulation, Ireland has such a system in place since 2007. There are over 700 DAFM-trained CC-FAS advisors in Ireland, which means that there is 1 advisor for every 200 farmers. These advisors are an important support to aid farmers' compliance with regulatory requirements. They are paid by farmers to give advice regarding scheme applications and with respect to regulatory needs.

These advisors are trained by the DAFM annually, and this training includes instruction on cross-compliance requirements under the GAP Regulations. Cross-compliance inspections are a check to ensure that farmers meet environmental, food-safety and land-management standards as set down in EU and/or national legislation. Farmers must meet these standards in order to receive payment under the Basic Payment Scheme, which is worth over €1 billion to Irish farmers annually. In some farming sectors, aid received under the Direct Payment Scheme can make up the majority of a farmer's income for the year. During annual training, issues found on farms in the previous year are highlighted. The most recent training for agricultural advisors included a session on water quality, delivered by the EPA, which aimed to improve advisors' understanding of the impact of nutrient losses from agriculture on water quality.

In addition to the GAP Regulations, there are a range of other agricultural support measures under Ireland's RDP, and these are outlined under section 3.3 below.

3.2 Other Measures for Delivery of Environmental Objectives

In addition to the three legal frameworks discussed above, a number of other measures were also in place or were developed during the first cycle:

- **Regulation of Domestic Waste-Water Treatment Systems:** Regulations (S.I. 2033 of 2012) have been put in place governing the operation and maintenance of domestic waste-water treatment systems (DWWTSs). All such systems require ongoing maintenance and desludging to ensure that the septic tank/ treatment plant operates effectively, and that solids do not enter the percolation area and clog the distribution pipework. These regulations require the owner to carry out such maintenance.

  The EPA is responsible for developing and implementing a national inspection plan to support these regulations. The first such plan: "National Inspection Plan 2013, Domestic Waste Water Treatment Systems", which covered the period 2013 to 2015, was published in February 2013. The aim of the Plan was to protect human health and water from the risks posed by DWWTS by using a two-strand approach in which education and awareness strategies are linked with a risk-based inspection process. The national inspection plans are delivered by local authorities, and the number of inspections for each county is allocated on the basis of potential risk. Accordingly, there is a particular focus on areas where the potential risk to public health and protected water resources is higher. Published reports summarise a total of 1,559 septic tank inspections that took place over the period from July 2013 to December 2014. Data for 2015 indicates that 1,097 inspections were completed that year, with advisory notices issued with regard to 488 systems which failed the inspection. As of September 2017, 362 of these have implemented the required remedial measures, and 126 notices remain open.

- **Pesticides Regulations:** EU Regulation 1107 of 2009 concerning the approval and placing on the market of pesticides is directly applicable to all member states. Ireland has provided the Regulation with further statutory standing through the Plant Products Regulations (S.I. 159 of 2012). In addition, the Sustainable Use of Pesticides Directive has been transposed into Irish law through the Sustainable Use of Pesticides Regulations (S.I. 155 of 2012). This provides for compulsory registration and training of professional users of pesticides (farmers and others) and for the application of buffer zones — in particular on lands surrounding drinking-water abstraction points. To date, over 24,000 farmers have been trained. Since November 2015, all plant-protection products must be applied by registered professional users (including farmers), and such users must have received suitable training and apply the principles of integrated pest management to ensure their appropriate usage. The requirement for all sprayers to be tested and approved for use came into force from December 2016 onwards, and 4,000 sprayers were tested in advance of this. Application restrictions driven by distances to water bodies vary between different pesticide products depending on individual risk assessments. MCPA-containing products cannot be applied within 5 metres of surface water bodies, and applications are not permitted on grassland in the period from October to February.

- **Environmental Impact Assessment (Agriculture) Regulations:** The Environmental Impact Assessment (EIA) (Agriculture) regulations came into force in September 2011 (S.I. 456 of 2011). These Regulations provide for an EIA screening and consent process for farmers with regard to three activities: (1) restructuring of rural land holdings (2) commencement of use of uncultivated land or semi-natural areas for intensive agriculture and (3) undertaking drainage works on lands used for agriculture. Where a farmer intends to undertake any of these activities, and the proposed works a) exceed certain threshold values or b) are to be carried out within (or may affect) a proposed Natural Heritage Area or a Nature Reserve, or c) may have a significant effect on the environment, the submission of an application (giving details of the proposed work) to the DAFM for screening is obligatory. There were a total of 629 such applications in the period from 2009 to 2015. If the proposed works exceed the threshold for mandatory environmental impact assessment or the DAFM, following screening, considers that the proposed works are likely to have a significant effect on the environment, work may not proceed without Departmental consent. These Regulations offer protection for valuable features in the landscape; not only by promoting biodiversity but also by mitigating erosion and sedimentation through restriction of the movement of water.

- **Rural Development Programme and the Green Low Carbon Agri-Environment Scheme:** The EU's Rural Development Policy (RDP) is intended to help the rural areas of the EU to meet the wide range of economic, environmental and social challenges of the 21st century. In Ireland, funding of just under €4 billion is allocated for the 2014–2020 period (€2.19 billion from the EU budget and €1.73 billion in national co-funding). A central priority of the Irish RDP is restoring, preserving and enhancing ecosystems related to agriculture and forestry.

  The Green, Low-Carbon, Agri-Environment Scheme (GLAS) is a targeted agri-environment scheme under the RDP. It has a budget of €1.4 billion for 2014–2020, making it the largest scheme in the RDP. There are 50,000 participants in the scheme. Once granted entry, farmers are told which action is most appropriate to their farm and must then adopt measures that will protect and improve water quality, such as fencing of watercourses (almost 16,600km to date) or growing catch crops (25,000 ha.)[6]. Priority access has been given to farmers in high-status water areas. All GLAS participants must engage a Farm Advisory Service advisor to draw up their application and prepare a nutrient-management plan.

  The financing of increased manure/slurry storage has been another important supporting measure provided for as part of the RDP. Over the period 2006–08, the Farm Waste Management Scheme provided total grant aid of €1.2 billion to approximately 43,000 farmers to enhance storage capacity. This resulted in a €2 billion investment in manure/slurry storage facilities with a capacity of 6 million m^3. Over the period to 2013, the Targeted Agricultural Modernisation Scheme provided a budget of €90 million to fund such measures as providing loose housing for sows and putting in place additional storage for livestock manure beyond the level required by the regulations. In addition, the Rural Environment Protection Scheme (a whole-farm approach to environmental protection) is estimated to have resulted in a spend of over €500 million on water-quality measures (over a period that includes the first cycle of the RBMP). The Agri Environment and Options Scheme (AEOS) — funded by modulated funds negotiated as part of the CAP Health check and topped up significantly by Exchequer funding — resulted in a spend of €226.3 million on water-related measures during the last RBMP cycle. This scheme was the first time a targeted rather than a whole-farm approach was taken in an agri-environmental scheme in Ireland.

- **Agricultural Catchments Programme:** This programme was established in 2008 to monitor the environmental and economic effects of Ireland's Nitrates Action Programme. It runs in four-year phases to analyse the effectiveness of measures, and all findings are published in peer-reviewed papers. It involves 6 catchments, with the voluntary engagement of over 300 farmers. There is evidence of significant beneficial change on many of the participating farms. Since the introduction of the GAP regulations in 2014, it has been found that there have been declines in farm-gate Nitrogen (N) and Phosphorus (P) surpluses (of 14% and 50%, respectively) and increases in N and P use efficiencies (of 2% and 18%, respectively) across 150 specialist dairy farms. The change was driven by the reduced use of chemical N and P fertilisers and by improvements in milk-solids output.

In terms of outcomes of the implementation of the Nitrates Directive in Ireland and the supporting measures outlined above, trends in the levels of nitrates in rivers, for example, show the positive impacts of these existing measures. EPA analysis of oxidised nitrogen trends over the period 2007–2015 found that 45% of monitored sites showed improving trends and a further 53% were stable, with only 2% of monitored sites showing deterioration. More specifically, for the monitoring period 2004-2006, 6% of sites were above 25 mg/l NO_3 annual average, whereas by 2012 this had fallen to 1% of monitored sites[7]. However, phosphorus trends pointed more to stability, with 62% of monitored sites showing stable trends over the period 2007–2015, 31% showing improvement and 4% showing a deterioration. Data from 2012 monitoring of orthophosphate levels in rivers showed that 15% of river sites were above 0.05 mg/l P compared to 21% in 2006.

6 Catch crops are sown to prevent minerals from being flushed away from the soil. They are effective in reducing nitrate leaching and can prevent the loss of up to 50kgs of nitrogen per hectare each year.

7 Environmental Protection Agency, 2016. Unpublished Assessment – A focus on Nitrates andPhosphorus in Irish Waters - Report on Nitrate and Phosphorus in Irish Water. EPA, Johnstown Castle, Ireland.

Section 4: Current State of the Water Environment

This section of the Plan offers a brief overview of how water quality in Ireland is monitored and assessed. It also provides summary details of the most recent water-quality results. Further details are available in the report *Water Quality in Ireland 2010-2015*[8]. The changes in status that have taken place over the period of the first cycle are also considered.

4.1 Assessing the Condition of Irish Waters

A comprehensive and representative environmental water-monitoring programme was designed and implemented in Ireland (EPA, 2006[9]) to support the implementation of the first river basin planning cycle. The monitoring programme provides the basis for describing the state of the aquatic environment, and for assessing the effectiveness of the programmes of measures in achieving the environmental objectives established through the river basin management planning process. The Environmental Protection Agency (EPA) has overall responsibility for the design and management of the monitoring programme, but responsibility for certain elements has been assigned by the EPA to a number of public bodies, including local authorities, Inland Fisheries Ireland, the National Parks and Wildlife Service, Waterways Ireland and the Marine Institute. Further information on the monitoring programme is provided in Section 12 of this Plan.

For the purposes of the Water Framework Directive (WFD), all waters have been grouped into types and further divided into individual management units called water bodies. There are 4,829 water bodies in the Irish RBD, comprising 513 groundwater bodies, 3,192 rivers, 818 lakes (206 covering areas greater than 50 ha.), 195 transitional waters and 111 coastal water bodies. Of the surface water bodies, 33 are heavily-modified. There are also currently 15 artificial water bodies.

The groundwater monitoring network consists of 332 monitoring sites. The river network consists of 3,193 monitoring sites covering 2,345 river water bodies. The lakes network consists of 216 lakes and 9 reservoirs. The transitional waters network consists of 80 monitored water bodies, and the coastal waters network consists of 43 monitored water bodies.

By European standards, Ireland has an extensive monitoring network. Nevertheless there are some areas for which we do not have site-specific monitoring information, such as small coastal streams, remote upland lakes and offshore coastal water bodies. This means that the condition of these water bodies cannot currently be verified. In these areas, the EPA has used the risk assessment process to identify the risks and to determine what sort of action, if any, is required (see Section 5 on characterisation).

WFD classification for groundwater bodies consists of quantitative status and groundwater chemical status. Each is assigned as having either good or poor status.

WFD classification for surface water bodies consists of ecological status and chemical status classification. These classification systems vary across rivers, lakes, transitional waters, and coastal waters. The quality elements relevant in assessing ecological status and ecological potential for surface waters include biological elements, water chemistry and the physical condition of water bodies.

Natural surface water bodies are assigned to one of five ecological status classes (high, good, moderate, poor or bad). Heavily modified water bodies (HMWBs) are assigned to one of 5 ecological potential classes (maximum, good, moderate, poor or bad). The status assigned is determined by the status of the poorest-quality element.

Full details of status assessments for previous periods, including the most recent Water Quality in Ireland report (2010–2015), are available on the EPA website.[10]

8 Water Quality in Ireland (2010-2015). EPA (2017)
9 http://www.epa.ie/pubs/reports/water/other/wfd/EPA_water_WFD_monitoring_programme_main_report.pdf
10 EPA Water Quality in Ireland reports: http://www.epa.ie/pubs/reports/water/waterqua/

4.2 The Ecological Status of Waters and Changes over the First Cycle

A summary of status for all monitored waters in the 2010–2015 period is provided in Figure 4.1.

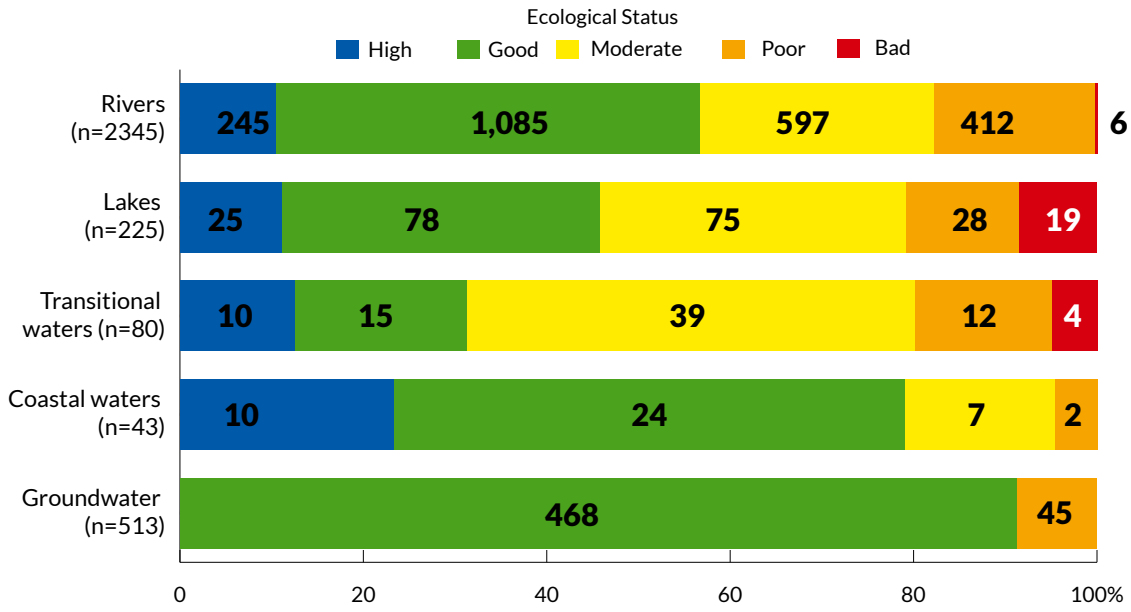


Figure 4.1 - Surface water ecological status for rivers, lakes, transitional and coastal waters and groundwater (2010-2015)[11]

11 These figures include 33 heavily modified water bodies (4 rivers, 16 lakes and 13 transitional and coastal waters)

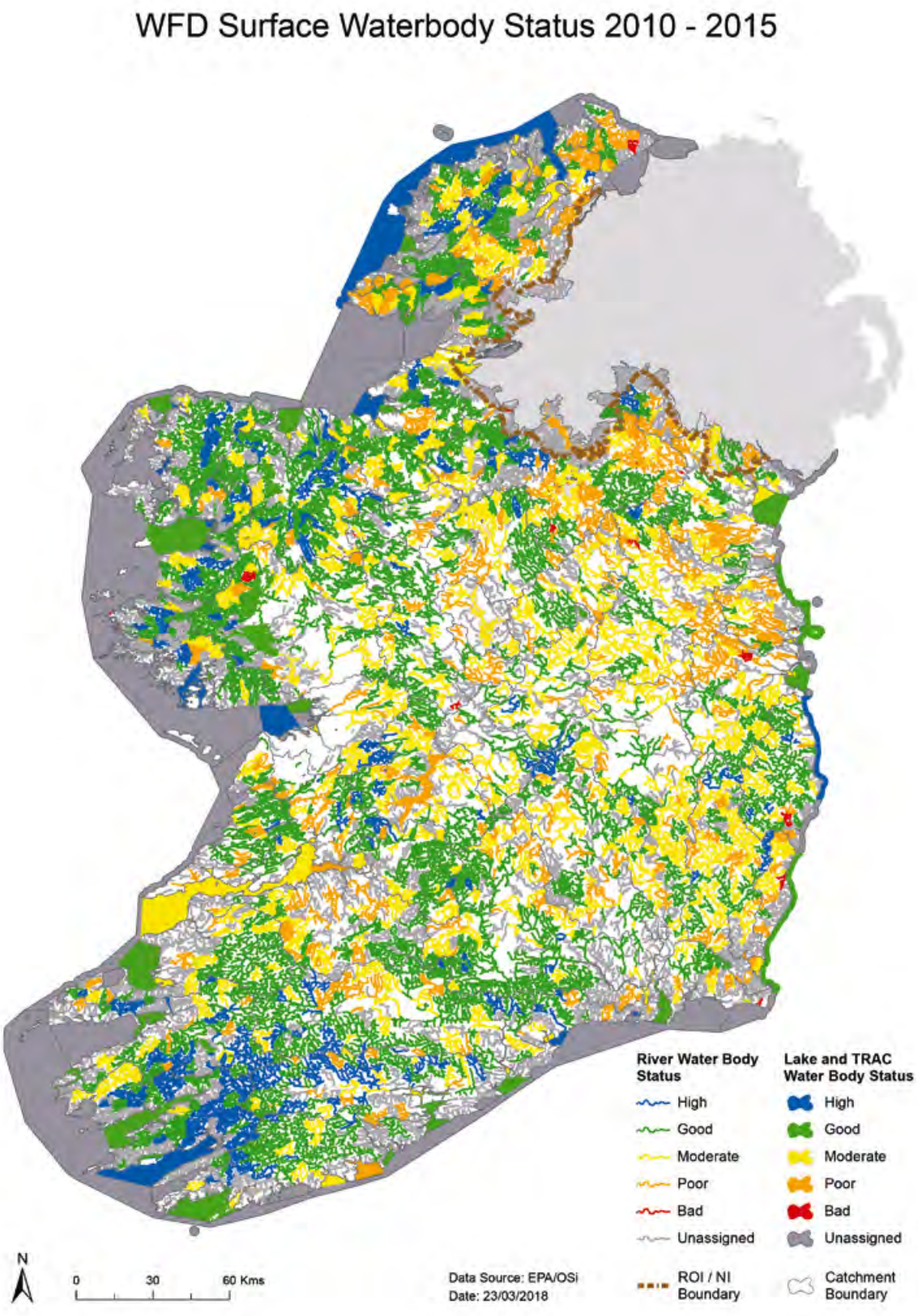


Figure 4.2 - Map of surface water ecological status for rivers, lakes, transitional and coastal waters and groundwater (2010-2015)

4.3 Heavily Modified Water Bodies and Artificial Water Bodies

The status of monitored Heavily Modified Water Bodies (HMWBs) and Artificial Water Bodies (AWBs) in the 2010–2015 period is summarised in Table 41.

Status of Heavily Modified & Artificial Water Bodies	Number of Water Bodies					
	Maximum	Good	Moderate	Poor	Bad	Unassigned
Rivers	0	1	0	2	0	1
Lakes	0	6	2	1	0	7
Transitional	0	0	7	0	0	3
Coastal	0	1	1	0	0	1
Artificial Water Bodies (Canals)[12]	0	12	1	1	0	0

Table 4.1 - Summary of WFD status for heavily modified water bodies and artificial water bodies (ecological potential) during 2010–2015

Status assessment of HMWBs and AWBs is based on best available information. The basis for HMWB designation and ecological potential will be reviewed by the EPA during the second cycle to take improved hydromorphological assessment methods into account (see Section 7.6).

4.4 Waters that have Improved or Deteriorated

The quality of our surface waters has remained relatively static since 2007–2009. However, Ireland did not achieve the national target of 13% improvement in water status over the first six-year river basin management cycle (2010–2015). While the national picture is relatively stable, some water bodies have improved while others have deteriorated (Table 4.2). The EPA is currently assessing the reasons for these changes, both positive and negative, to help inform what actions are needed to protect and improve water quality.

Water Category	Number and Percentage of Water Bodies Unchanged in Ecological Status over Cycle 1	Number and Percentage of Water Bodies that Improved in Ecological Status over Cycle 1	Number and Percentage of Water Bodies that Deteriorated in Ecological Status over Cycle 1
Rivers	1,227 (57%)	418 (20%)	499 (23%)
Lakes	122 (59%)	38 (18%)	48 (23%)
Transitional Waters	63 (79%)	6 (7%)	11 (14%)
Coastal Waters	30 (70%)	6 (14%)	7 (16%)
Total	1,442	468	565

Table 4.2 - Changes in the ecological status of surface water bodies over cycle 1 (2010–2015)

12 Excluding Grand Canal Basin

Elevated nutrient concentrations (phosphorus and nitrogen) continue to be the most widespread water-quality problem in Ireland. In the freshwater environment, elevated concentrations of phosphorus are the primary reason for ecological impact in our rivers and lakes. While phosphorus concentrations have declined in recent decades, the downward trend appears to be tapering off and increases have been observed in some rivers since 2014. Siltation in some rivers continues to be a problem. Nitrogen is a more significant factor in our transitional and coastal waters. Nutrient inputs into the marine environment have shown substantial decreases since 1990. However, the rate of decrease has slowed in recent years, and in some cases the level of nutrient inputs to the marine environment has increased. Measures to address nutrient discharges to waters are described in Section 7.

The reduction in the level of seriously polluted waters has continued, with only 6 river water bodies assigned bad status under the WFD in 2010–2015 compared to 19 in 2007–2009. This is largely a result of the concerted effort, called the "Red Dots" programme and led by the EPA, which was implemented to tackle these water bodies, in which urban waste-water discharges were the primary cause of water-quality problems.

At the other end of the scale, the worrying loss of the highest quality river sites has continued (Section 4.5).

4.5 The Continued Long-Term Decline in High-Status River Catchments

The previously observed long-term trend of decline in the number of high-status (Q5 and Q4-5) river sites is continuing (Figure 4.3). Of monitored river sites, 18% had high-status in 2013–2015, compared to 32% in 1987–1990. Q5 sites, which represent the highest-quality waters, have reduced to a very low number of 21 river sites, down from over 500 sites in the late 1980s. The number of river water bodies assigned high-status under the WFD reduced from 287 in 2007–2009 to 245 in 2010–2015. Measures to address the decline in high-status catchments are outlined in Section 8.3.2.

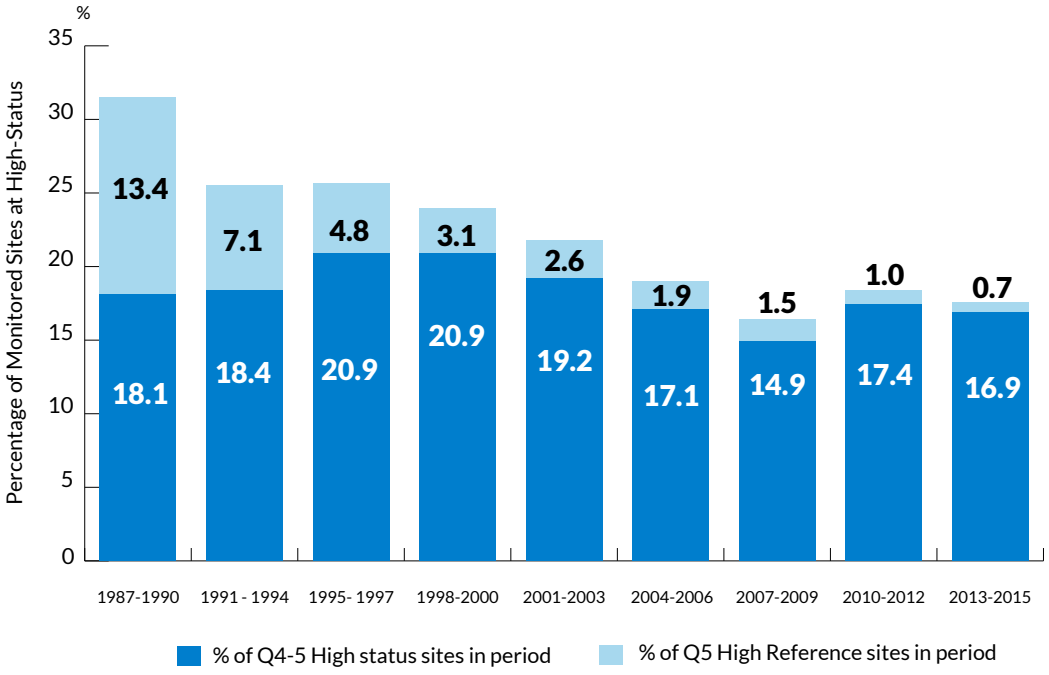


Figure 4.3 - Observed long-term decline in the extent of high ecological quality river sites

4.6 Chemical Status of Surface Waters

Surface water chemical status was assessed following analysis of the EU list of 25 priority and 14 priority hazardous substances from the national surveillance monitoring network. The surveillance monitoring network is a nationally representative network of surface water bodies and consists of 179 river water bodies, 76 lakes, 30 transitional water bodies and 12 coastal water bodies.

As expected, polyaromatic hydrocarbons (PAHs) and mercury did show widespread exceedances of the EQS at monitoring sites. However, these substances have been identified at EU level as ubiquitous, and they occur widely in the environment on a global scale, due principally to atmospheric deposition. These can be found for decades in the aquatic environment at levels posing a significant risk, even if extensive measures to reduce or eliminate emissions of such substances have already been taken. Some are also capable of long-range transport. Therefore, non-compliant results do not infer specific issues local to a water body or indeed to a river basin district.

Overall, the level of compliance with environmental quality standards for hazardous substances remains high across all waters, which indicates that these substances are not a significant issue in the water environment in Ireland.

When the widespread pollutants mercury and PAHs are excluded, only 4 (1.3%, consisting of 2 rivers, 1 lake and 1 transitional) of the 297 water bodies were at poor chemical status (Figure 4.4). Substances that have exceeded standards include metals (cadmium, lead and nickel), two pesticides (atrazine and simazine) and the plasticiser Di(2ethylhexyl)-phthalate (DEHP).

The EPA has recently established a National Aquatic Environmental Chemistry Group (NAECG), which will bring an improved strategic approach to the monitoring and management of hazardous chemicals in the aquatic environment (See Section 7.8.5).

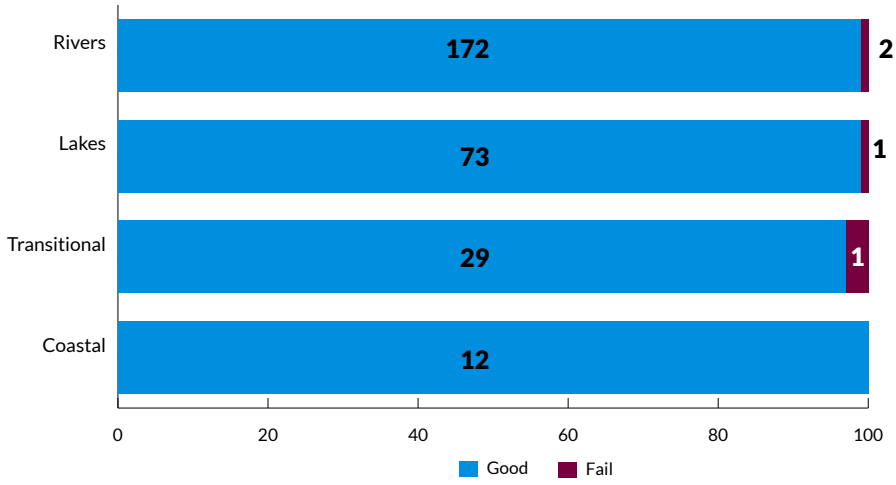


Figure 4.4 - Chemical status of monitored surface water bodies (2010-2015)

4.7 The Condition of Water-Dependent Protected Areas

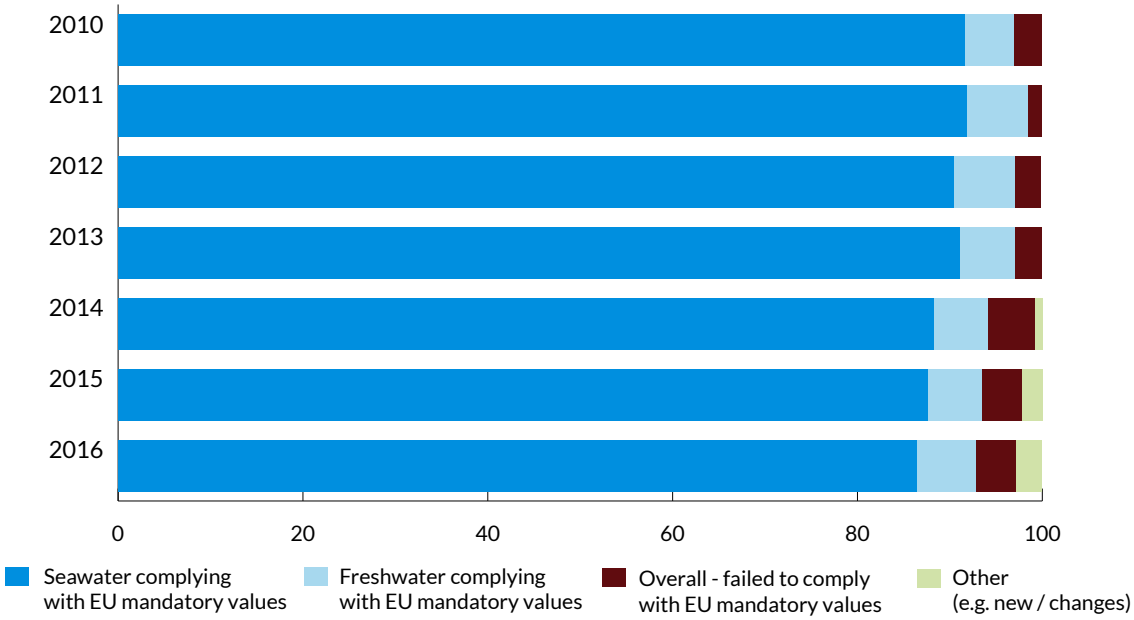
Protected areas are areas that have been designated as needing special protection because of their particular importance as bathing waters, as sources of drinking water, as areas in which shellfish are grown or harvested, as locations with sensitive habitats and species or as areas that are particularly affected by eutrophication due to excessive inputs of phosphorus and/or nitrogen. The water-related condition of these protected areas is set out below.

4.7.1 Bathing Waters

The EPA publishes annual reports "Bathing Water Quality in Ireland". These reports demonstrate that bathing-water quality has been of a consistently high standard over a number of years.

In the latest published report for 2016, 130 out of a total of 140, or 92.9%, of bathing waters met the EU mandatory values.[12] 120 (85.7%) bathing waters were classified as being of "Excellent" or "Good" water quality compared to 114 (83.2%) in 2015.

A summary of the results showing compliance with EU mandatory values, for both freshwater and coastal locations, for the years 2010 to 2016, inclusive, is presented in Figure 4.5. Urban waste-water pressures in four of the currently non-compliant bathing waters will be addressed through the Irish Water investment plan. These works are described in Section 8.2.



Note: New stricter compliance criteria were applied with effect from 2014 introducing additional classifications

Figure 4.5 - Bathing-water-quality compliance in Ireland (as percentages) 2010–2016 [14]

13 Bathing Water Quality in Ireland 2016, EPA (2017) http://www.epa.ie/pubs/reports/water/bathing/BW%20Report%202016_web.pdf

14 New stricter compliance criteria were applied with effect from 2014, introducing additional classifications. The "other" category includes both newly identified bathing waters and areas where there have been major infrastructural changes. There are fewer than the 16 samples required for formal assessment of these bathing waters.

4.7.2 Nutrient-Sensitive Areas

EU member states are required under the Urban Waste Water Treatment Directive (91/271/EEC) to identify nutrient-sensitive areas. These have been defined as "natural freshwater lakes, other freshwater bodies, estuaries and coastal waters which are found to be eutrophic or which in the near future may become eutrophic if protective action is not taken". Assessments are carried out on waters downstream of urban waste-water discharges from urban areas above a population equivalent (PE) of 10,000.

The EPA recently carried out a review of nutrient-sensitive areas. As a result, 72 waste-water discharges with PE above 10,000 were identified, and downstream waters were assessed. 47 of the 72 areas showed evidence of nutrient sensitivity. This number includes those areas which have already been identified as nutrient sensitive.

4.7.3 Drinking Water Protected Areas

The WFD requires the identification of Drinking Water Protected Areas (DWPAs). These are lakes, reservoirs, rivers and groundwater bodies from which water is abstracted to provide water for people to drink. Where necessary this raw water is treated to purify it to the required drinking-water standard. In order to protect water from contamination from substances leading to the need for more treatment, the risks need to be identified.

Information in the EPA's *Drinking Water Report for Public Supplies 2016* and other supplementary information were examined. With regard to the quality of drinking water following treatment, over 99% of samples complied with microbiological and chemical standards. The WFD requires that waters used for the abstraction of drinking water are protected, so as to avoid deterioration in quality. For the purpose of identifying at-risk DWPAs, levels of pesticides and nitrates were assessed.

In 2016, 44 out of 904 public water supplies failed to meet the pesticides standard, and 2 supplies failed to meet the nitrate standard, as set out in the European Union (Drinking Water) Regulation 2014. Steps being taken to address these issues are described in Section 8.1.

4.7.4 Shellfish Waters

In Ireland, 64 areas have been designated as shellfish waters (S.I. No. 268 of 2006, S.I. No. 55 of 2009, S.I. 464 of 2009). With regard to water-quality standards, the measured average dissolved concentrations for metals complied with the environmental quality standards for the period 2009–2015. While average total chromium concentrations were elevated at four locations (Sneem/Ardgroom, Valentia River, Bruckless, and Gweedore Bay), this was because of a single extreme value recorded in each case.

In respect of microbiological quality, overall achievement of the guide *E. Coli* value was relatively stable throughout the 7-year assessment period (2009–2015) (Figure 4.6).

Between 2009 and 2015, the areas that most frequently failed to meet the guide value were: Adrigole Harbour, Bannow Bay, Bantry, Cork North Channel, Cromane, Gweedore Bay, Kinsale, Loughras Beg, Tralee Bay and Wexford Harbour (inner and outer). Urban waste-water discharges in the vicinity of shellfish waters are being assessed to determine whether they are contributing to failures in shellfish-water objectives and, in turn, whether more stringent waste-water treatment is required.

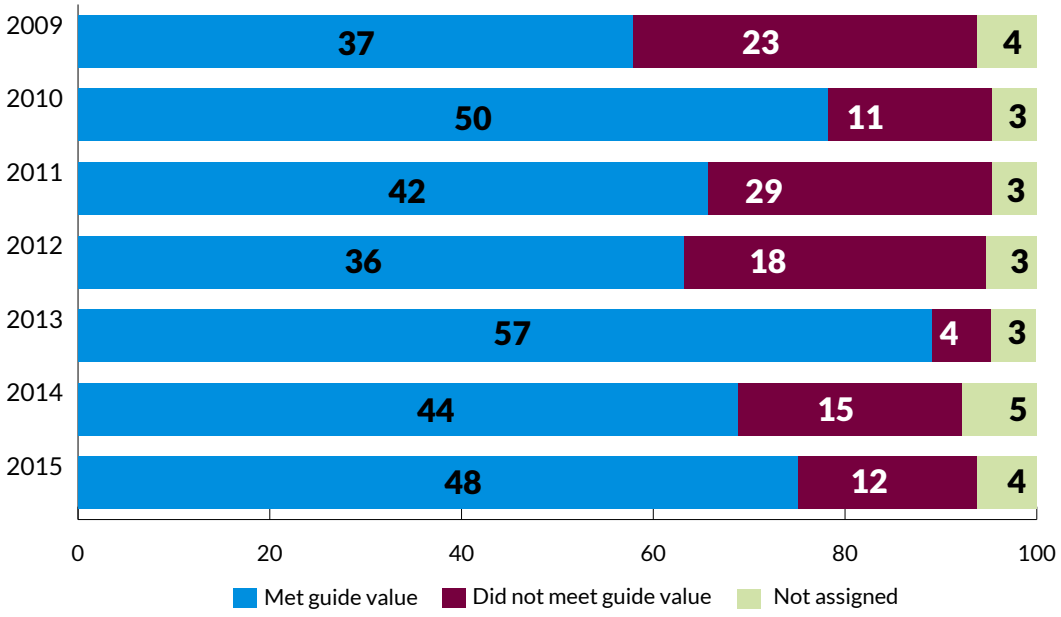


Figure 4.6 - Numbers of designated shellfish waters meeting the *E. Coli* guide values on an annual basis

4.7.5 Protected Water-Dependent Habitats and Species

Freshwater Pearl Mussel

Ireland has identified 430 candidate Special Areas of Conservation (SACs), of which, 358 (83%) contain at least one water-dependant feature, i.e. water-dependent habitats and/or water-dependent protected species. There are 44 different water-dependent habitat types and 22 water-dependent species that have been identified by National Parks and Wildlife Service. Five of these water- dependent habitats (11%) are deemed to be at Favourable Conservation Status, while eleven water-dependent species (50%) are at Favourable Conservation Status[14] (Figure 4.7).

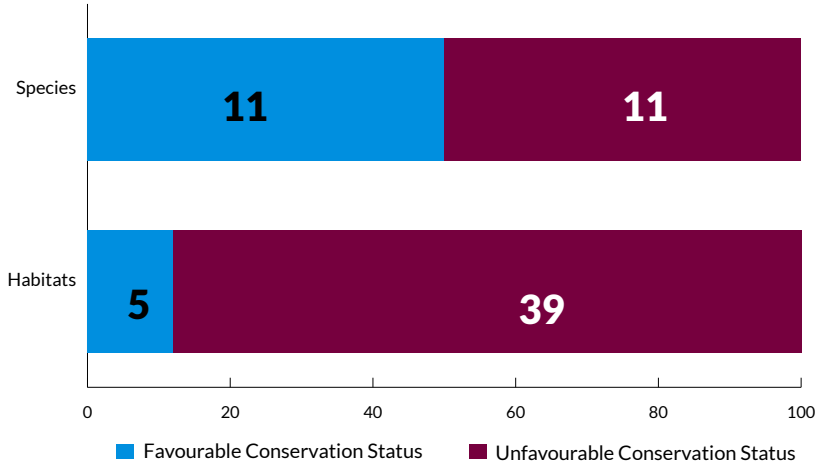


Figure 4.7 - Numbers of designated Natura 2000 water-dependent species and habitats meeting their conservation objectives (2013–2015)

Protected water-dependent habitats and species are present in 825 river water bodies, 214 lakes, 128 transitional water bodies and 80 coastal water bodies. However, only some of the water-dependent habitats and species have known specific supporting water requirements, such as high-status for the Freshwater Pearl Mussel (*Margaritifera Margaritifera*), good status for Atlantic salmon (*Salmo salar*) and at least moderate status for the white clawed crayfish (*Austropotamobius pallipes*). In the habitats and species for which the supporting water conditions are known, the available information was used to determine the specific locations where they are present, and consequently the water bodies in which they are located. Each of those water bodies were assessed to determine whether or not the required supporting water conditions were being met. Where they were not being met, it was concluded that the water body was not meeting its WFD Protected area objectives.

15 The Status of EU protected Habitats and Species in Ireland, NPWS (2013), https://www.npws.ie/article-17-reports-0

There are 153 river water bodies, 31 lakes and 11 transitional water bodies where the water-supporting conditions for protected water-dependent habitats and species are not being met. There are a further 39 river water bodies, 55 lakes and 18 transitional and 8 groundwater bodies where the water-supporting conditions for protected water-dependent habitats and species are known. The water bodies are unmonitored, however, and it is therefore unclear whether their objectives have been met. Further monitoring is required in these instances.

With regard to the Freshwater Pearl Mussel, there are 27 designated populations, all of which are at Unfavourable Conservation Status. Of these, the top 8, which represents 80% of the total population and includes those with the best chance of recovery, have been prioritised for action. These priority populations are present in 28 river water bodies, of which 12 (43%) had met their high-status target in the 2013–2015 monitoring cycle. Planned measures are described in Section 8.2.

Groundwater Dependent Terrestrial Ecosystems (GWDTEs), such as fens, turloughs and bogs, have been assessed as part of the River Basin Characterisation and Classification assessment process. Of 63 GWDTEs identified as failing to achieve their conservation objectives, groundwater was judged to be a potential contributing factor for 29 of these.

Additional water-quality criteria and/or more stringent criteria may be defined in the future for particular habitats and species. For the purpose of this Plan two habitat types (marl lakes and oligotrophic lakes) have been identified for further investigation (see Section 8.2).

Section 5: Catchment Characterisation & Environmental Pressures on the Water Environment

An important part of developing the *River Basin Management Plan* (RBMP) is to understand the pressures impacting on water status, so that measures to manage those pressures can be identified and implemented. The catchment characterisation process, undertaken by the Environmental Protection Agency (EPA), with the assistance of members of the National Technical Implementation Group (NTIG), assessed the risk of water bodies not meeting the requirements of the Water Framework Directive (WFD), and identified the significant pressures on each water body that is *At Risk* of not meeting its objectives.

Environmental pressures can arise either from "point-source pollution" from human activities undertaken in specific locations (e.g. farmyards, waste-water treatment plants and septic-tank systems) or "diffuse-source pollution" from widely dispersed human activities (e.g. land-spreading of fertilizers and surface runoff in urban areas).

A substantial body of work has been completed to assess the significant pressures on waters on a variety of geographic scales (water body, sub-catchment and catchment) over the past three years. This exercise incorporated work on river and lake water bodies at a sub-catchment scale which was completed in 2016 to inform the draft Plan. In 2017, this information was further assessed at a catchment scale, together with transitional, coastal and groundwater water body assessments to inform the final Plan.

The key goal of this characterisation process is to identify water bodies and protected areas which require action to meet the relevant objectives, while also identifying the significant pressures impacting on those water bodies. The characterisation process provides important information that is needed to inform the development of a programme of measures, and to allow a realistic and achievable Plan to be developed and implemented.

5.1 Risks to Water Bodies

A risk assessment process was carried out to identify water bodies that were at risk of not achieving their WFD objectives. The risk was assessed on the basis of the monitoring data for the period 2007–2015, including data on status, water quality trends and the scale of the challenges involved in meeting the environmental targets set by the WFD. Where the monitoring data indicated that there was a risk that the environmental objectives would not be achieved in respect of certain water bodies, an assessment was then carried out to identify the significant pressures impacting on water status.

The risk assessment of the significant pressures considered the linkages and dependencies between the sources of environmental pressures, and the pathways linking those pressures to the receptors, such as rivers, lakes or groundwater.

Account was taken of the sensitivity of some water-based ecosystems to nutrients and/or sediment and/or water abstraction arising from human activities, and of physical alterations to surface waters — such as dredging, river-bank works and channelisation — which can also damage aquatic ecosystems. Models were used to help determine the most important environmental issues and pressures in each sub-catchment and to identify the key areas to target to achieve improved outcomes. Evidence and expertise from a range of public bodies has also informed the process.

The outcome of these assessments has informed the setting of objectives for water bodies, and the measures that need to be taken to achieve those objectives.

5.2 National Overview of Risk Assessment

Across all five water categories, which encompass a total of 4,829 water bodies, the characterisation process has shown that:

- 2,113 (44%) fall within the *Not at Risk* category; they are achieving the requirements of the Directive and meeting their environmental objective of good or high-status.
- 1,460 (30%) are *At Risk* of not meeting their environmental objective of good or high-status
- 1,256 (26%) are currently *Under Review*, which means either that the measure is in place but the water quality improvement has not yet been realised or, more commonly, that there is currently inadequate information to determine whether or not the water body is *At Risk*.

Table 5.1 provides statistics on the risk categories on a national basis for rivers, lakes, groundwater, transitional waters and coastal water bodies.

Water Body Type	No. of Water Bodies (WBs)	At Risk		Under Review		Not at Risk	
		WB No.	WB %	WB No.	WB %	WB No.	WB %
Rivers	3,192	1,184	37	687	22	1,321	41
Lakes	818	132	16	264	32	422	52
Transitional	195	56	29	80	41	59	30
Coastal	111	13	12	34	30	64	58
Groundwater	513	75	15	191	37	247	48
Total	**4,829**	**1,460**	**30**	**1,256**	**26**	**2,113**	**44**

Table 5.1 - Summary of the groundwater and surface water body risk assessment

5.2.1 Water Bodies for which the Objective is High Status

Nationally, there are 384 river, lake, transitional and coastal water bodies that have a High Ecological Status Objective. These include 28 river water bodies in the catchment areas of the 8 priority Freshwater Pearl Mussel Rivers. Of the 384 water bodies, 243(63%) are currently meeting this objective and are *Not at Risk*; 14 (4%) are *Under Review*; and 127 (33%) are *At Risk* of not meeting their high-status objective and require further action.

Water Body Type	No. of High Ecological Status Objective WBs	At Risk		Review		Not at Risk	
		WB No.	WB %	WB No.	WB %	WB No.	WB %
Rivers	319	112	35	3	1	204	64
Lakes	37	12	32	2	5	23	62
Transitional	12	1	8	2	17	9	75
Coastal	16	2	13	7	44	7	44
Total	**384**	**127**	**33**	**14**	**4**	**243**	**63**

Table 5.2 - Summary of surface water risk assessment for high ecological status Water Bodies

5.2.2 Water-Dependent Habitats and Species in Special Areas of Conservation

There are 155 river water bodies, 31 lakes and 11 transitional water bodies where the water-supporting conditions for protected Natura 2000 water-dependent habitats and species are not being met. These water bodies all require action. There are a further 39 river water bodies, 55 lakes and 18 transitional water bodies where, although the water-supporting conditions for protected water-dependent habitats and species are known, the absence of monitoring leaves it unclear whether their objectives have been met.

In the absence of further information from similar water bodies under similar pressures, these water bodies will require further monitoring.

Of the 29 Groundwater Dependent Terrestrial Ecosystems (GWDTEs) where groundwater was judged to be potentially a contributing factor to not meeting their conservation objectives, 3 were confirmed as being *At Risk* and the remaining 26 are *Under Review*.

5.2.3 Assessing Risk in Waters Not Covered by the National Monitoring Programme

As previously stated, Ireland has an extensive monitoring network by European standards. However, there are a number of water bodies — including small coastal streams, remote upland lakes and offshore coastal water bodies— for which we do not have site-specific monitoring information. We have used our risk-assessment process to identify the risks in these cases.

Figure 5.1 shows the risk categories identified for unmonitored water bodies. Unmonitored water bodies that are evaluated as being *Not at Risk* have no significant environmental pressures associated with them; therefore, no further action is necessary, other than continued implementation of existing measures. A large proportion of coastal water bodies, groundwater bodies and lakes are *Not at Risk*. For rivers and transitional waters however, the largest proportion of unmonitored river water bodies require *Review*. These water bodies will require further information to be collected to confirm their risk characterisation, and those found to be *At Risk* will be considered for inclusion in the national monitoring programme.

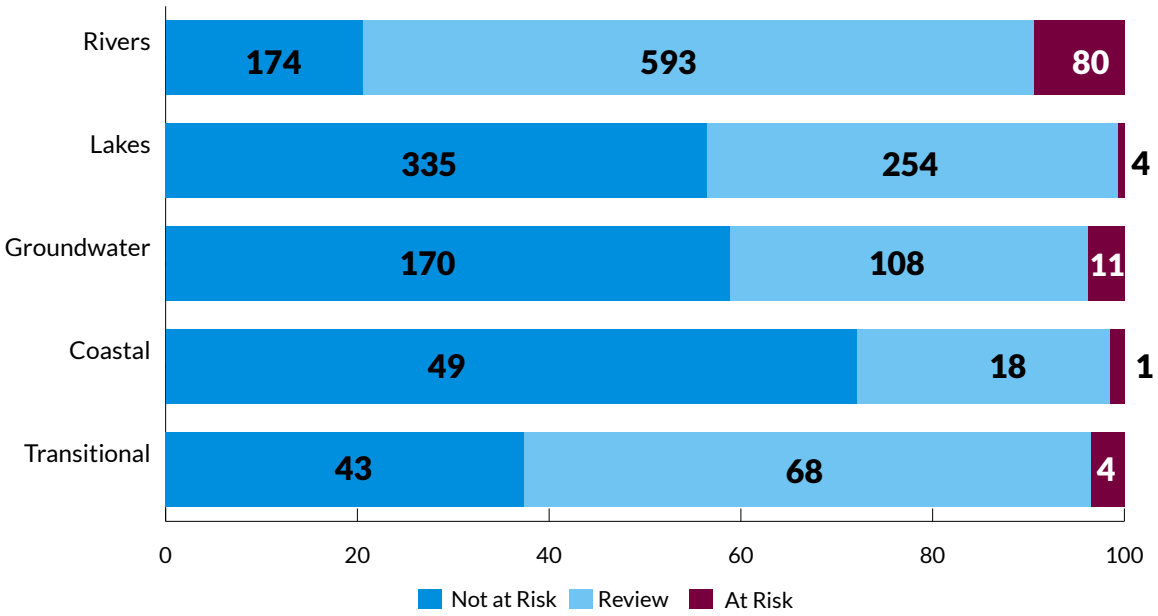


Figure 5.1 - Risk assessment outcomes for water bodies without water body specific monitoring data (2013–2015)

5.3 Assessment of Significant Environmental Pressures

5.3.1 Overview of Assessment

Having identified those groundwater and surface water bodies *At Risk* of not meeting their environmental objectives, detailed assessments were undertaken by the EPA to identify the likely significant pressures preventing the water bodies from achieving the required environmental objectives. Significant pressures are those that either cause or are likely to cause an unsatisfactory water body status. Measures therefore need to be taken in order to mitigate the impact(s) of these pressures.

These assessments are based on over 142 national datasets comprising information on pressures, impacts and physical settings. In addition, local authorities, Inland Fisheries Ireland (IFI) and Irish Water provided local knowledge and information, which was incorporated into the assessment. In total, 17 pressure types were considered and summarised under 12 broad headings. Brief details on the information used in the assessment of pressures are given in the following table (Table 5.3):

No.	Environmental Pressures
1	**Agriculture** Evaluation of agriculture as a significant pressure involved the following: checking for water-quality indicators, such as the presence of high phosphate, nitrate or ammonium concentrations; evaluating the presence of surface-flow pathways for nutrients and sediment to surface waters, such as poorly draining soils and subsoils, and for underground pathways based on aquifer and groundwater vulnerability maps; use of maps showing critical source areas for phosphate loss to surface waters (these are based on estimates of the nutrient load applied to land by farmers and the land-drainage characteristics); and information from the EPA source load apportionment model, which estimates the proportion of the catchment's nutrient load that can be attributed to each human activity. Additional local knowledge and expertise was provided by the local authorities and IFI inspectors.
2	**Domestic Waste-Water Treatment Systems** The information used in assessing the impact of domestic waste-water treatment systems consisted of the following: landscape drainage characteristics (based on soils, subsoils and bedrock maps) indicating percolation conditions; details of the locations and densities of houses, particularly in areas with poor drainage characteristics; and local authority information from inspections.
3	**Urban Waste-Water** Information available on discharges from urban waste-water treatment systems was used as the basis for assessing their impact. Among the sources of this information were the Annual Environmental Reports submitted by Irish Water to the EPA, data and information from EPA licensing and enforcement teams, and upstream and downstream ambient monitoring data for many plants. In addition, the EPA source load apportionment model results enabled the proportion of the nutrient load in rivers arising from plants to be considered.
4	**Urban Runoff** Urban runoff (i.e. misconnections from private foul connections to storm sewers, leakage from sewers and runoff from paved and unpaved surfaces) was categorised as a significant pressure where there were monitoring data for upstream and downstream of the urban areas, and where there were additional local authority and IFI data and on-the-ground knowledge.
5	**Forestry** The impact of forestry was assessed using nutrient water-quality monitoring data and evidence of sediment impacts observed during the biological assessments; aerial photography to check for new plantations and recent clear felling; Forest Service and Coillte forestry mapping; soil-drainage characteristics that could facilitate runoff of sediment; and clear-felling license applications.

No.	Environmental Pressures
6,7,8	**Extractive Industry, Industry, Waste** Assessment of these pressures used the following information: maps showing locations of EPA licensed sites and relevant Local Authority Section 4 discharges to water; aerial photography; peat extraction maps; information from EPA licensing and enforcement teams, including Annual Environmental Reports submitted to the EPA; local authority Section 4 discharge-monitoring data; and hydrochemistry data as an indicator for a particular pressure, ammonium, for example, which is often present in water in peatland areas.
9	**Invasive Species** The impact of invasive species was not assessed in detail because the available information is limited. However, information on their presence at EPA biological monitoring sites and data from the local authorities and IFI were used.
10	**Environmental Pressures Impacting on the Physical Condition of Surface Waters (Hydromorphology)** Assessing the significance of environmental pressures impacting on the physical condition of surface waters (Hydromorphology) involved consideration of available biological and hydromorphological (physical condition) evidence of impact based on monitoring information. This included fish-status assessments, River Hydromorphological Assessments (River-HAT), Q-values and siltation levels. The assessment examined the likely causes of observed impacts, including the presence of channel modifications (e.g. arterial drainage and embankment works), land drainage schemes, deforestation activities and barriers to fish migration based on available maps and aerial photography. This was also supplemented by local knowledge provided by local authorities and IFI.
11	**Abstractions/Diversion** A detailed quantitative screening assessment of possible impacts of water-abstraction pressures on ecology was undertaken by EPA. This assessment compared abstraction volumes with estimated natural-water flows. A recently updated EPA abstractions dataset was used in the assessment, along with an updated discharges dataset and modelled river flow data using the EPA Hydrotool model. Hydrological flow standards, similar to those used to assess abstraction impact in Northern Ireland, were used to screen the assessment to identify which rivers and lakes could potentially be *At Risk* of failing to achieve their environmental objectives due to over abstraction. The biological-status data from the EPA and IFI were then used to determine which of those water bodies were actually failing to meet their environmental objectives and require more detailed investigation.
12	**Historically Polluted Sites** Evaluation of these sites was based largely on groundwater monitoring data for the specific pollutants likely to arise and from upstream and downstream chemical and biological monitoring data, as well as on maps showing locations of EPA surrendered- waste-licenses sites.

Table 5.3 - Information used in the assessment of environmental pressures at water-body level

5.3.2 Significant Pressures

Identification of the significant pressures provides the means to target local measures, as well as providing a picture at national level to inform overarching measures and national policy requirements. Nationally, 1,460 river, lake, groundwater, transitional and coastal water bodies are *At Risk* of not meeting their environmental objectives. The assessment of risks and pressures has helped to inform the formulation of measures contained in this RBMP Figure 5.2 below, shows the frequency of significant pressures causing water bodies to be *At Risk*.

Of these 1,460 water bodies that are *At Risk*, 765 (52%) are impacted by a single significant pressure, while the remaining 695 (48%) are impacted by more than one significant pressure.

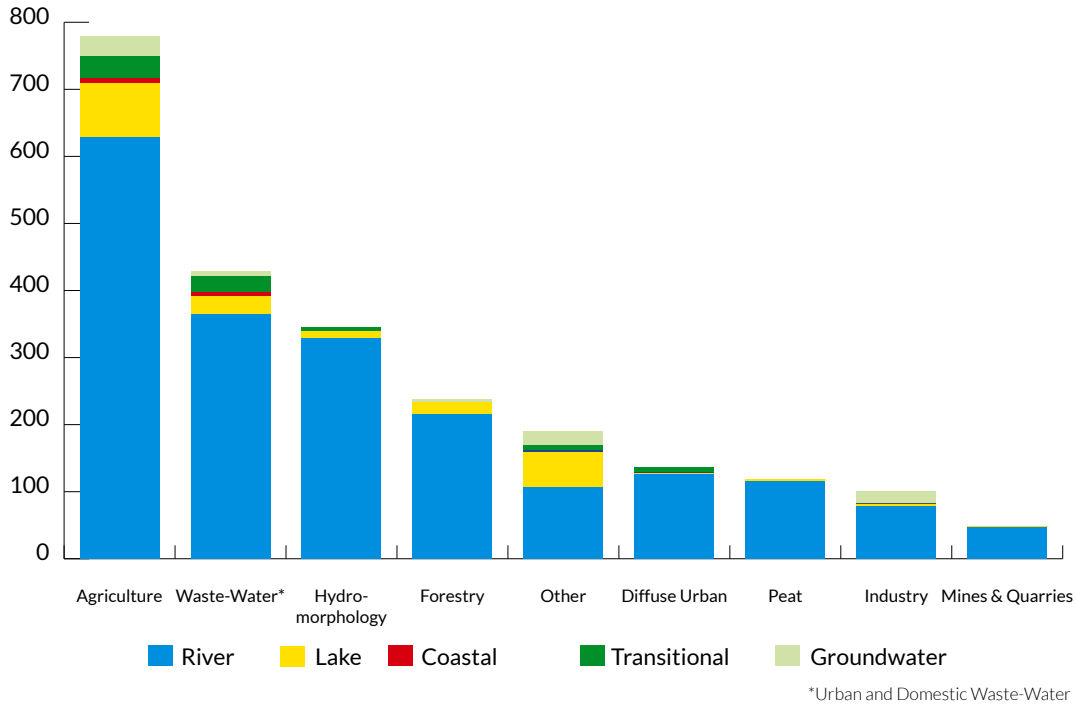


Figure 5.2 - Frequency of significant pressures on *At Risk* water bodies

Agriculture has been identified as a significant pressure in 780 (53%) of the 1,460 water bodies identified as *At Risk* of not meeting their environmental objective. Of these water bodies, 629 are rivers, 80 are lakes, 8 are coastal waters, 32 are transitional waters, and 31 are groundwater. Impacts are evident in all catchments but are most prevalent in the eastern half of the country, particularly in areas where there are poorly drained soils and subsoils (Figure 5.3a) — Cavan, Monaghan and Meath, for example — where excess phosphorus is the issue. The pressures relate to diffuse runoff of nutrients and sediment from land, and to point source pollution associated with farmyards. Along the southern catchments, where the soils and subsoils are free draining, the estuaries are impacted by excess nitrogen from the contributing catchment areas. Further work is required to determine precisely where the hotspot areas for targeting of action are located.

Hydromorphology is a significant pressure in 345 (24%) water bodies identified as *At Risk*. Of these water bodies, 329 are rivers, 10 are lakes, and 6 are transitional waters. The pressure relates to physical modification or damage to habitat and natural river/lake processes, and changes functions caused by channelisation, land drainage, dams, weirs, barriers and locks, overgrazing, embankments and culverts. A spatial pattern is less evident given the variety of issues causing hydromorphology to be a significant pressure (Figure 5.3b). It is anticipated that as our knowledge and understanding of hydromorphological pressures improves, so too will the extent of the impacts identified across the country.

Urban waste-water is a significant pressure in 293 (20%) water bodies identified as *At Risk*. This equates to 252 rivers, 15 lakes, 3 coastal waters, and 23 transitional waters. Storm water overflows are believed to be impacting on 22 water bodies.

It should be noted that many water bodies contain multiple urban waste-water discharges of differing agglomeration sizes. The distribution of urban waste-water treatment plants means that they are largely focused in the eastern half of the country and are coincident with higher population centres (Figure 5.3c).

Forestry is a significant pressure in 238 (16%) water bodies identified as *At Risk*. This equates to 215 rivers, 18 lakes, and 5 groundwater bodies. The pressure is largely associated with sediment from clear felling, drainage, and planting and establishment. The significant pressure is predominantly located in catchment headwaters and is often coincident with catchment boundaries (Figure 5.3d).

Peat extraction has been identified as causing a significant risk to ecological status in 119 water bodies, which represents 8% of all water bodies that have been identified as *At Risk* (Figure 5.3e). Of these, 115 are rivers, 3 are lakes and 1 is groundwater. The environmental impacts generally relate to suspended solids, ammonia and hydromorphological alterations. There is evidence that high levels of ammonia are being released from peat-extraction activities during the draining process and, along with suspended solids, may be causing ecological impacts in receiving water bodies. The EPA plans to investigate the background concentrations of ammonia in peatlands to determine if they can be a contributory factor in elevated ammonia concentrations in water bodies.

Domestic waste-water includes septic-tank systems associated with one-off housing and unlicensed private urban waste-water treatment plants, and is a significant pressure in 166 (11%) water bodies identified as *At Risk*. Of these, 137 are rivers, 15 are lakes, 2 are coastal waters, 6 are transitional waters and 6 are groundwater bodies.

Urban runoff relates to a mixture of misconnections, leakage from sewers and runoff from paved and unpaved areas and is a significant pressure in 136 (9%) water bodies identified as *At Risk*. This equates to 126 rivers, 2 lakes, 1 coastal water body and 7 transitional waters.

Invasive Alien Species (IAS) are non-native species introduced outside their natural range that threaten ecosystems, habitats and native species with environmental or socio-economic harm. Currently 37 species have been identified across the EU as a high priority for management, and nine of these occur in Ireland. The river basin public consultations on significant water-management issues in 2015 identified IAS as a significant issue for water management. For example, two species that pose a threat to aquatic ecosystems when present in riparian zones — Japanese Knotweed and Himalayan balsam — have been recorded

throughout a significant proportion of the countryside by the National Biodiversity Centre.

Industry is a significant pressure in 101 (7%) water bodies identified as *At Risk*. Pressures include IPPC (20) and IE (26) facilities licensed by the EPA and industries with Section 4 Discharge to Water licenses (43) issued by local authorities. Of these 101 water bodies, 78 are rivers, 3 are lakes, 1 is a coastal water body, 1 is a transitional water body, and 18 are groundwater bodies.

Water abstraction is the taking of water from a surface water or groundwater body, either permanently or temporarily. Abstraction of water can involve pumping, piping, diverting water into a reservoir, or sinking a borehole or well. Water is abstracted for many purposes including public and private drinking-water supply, industrial use, use in the food and drink industry, hydro-power generation, agricultural and agri-industry use, recreational use (such as golf courses) and use in fisheries.

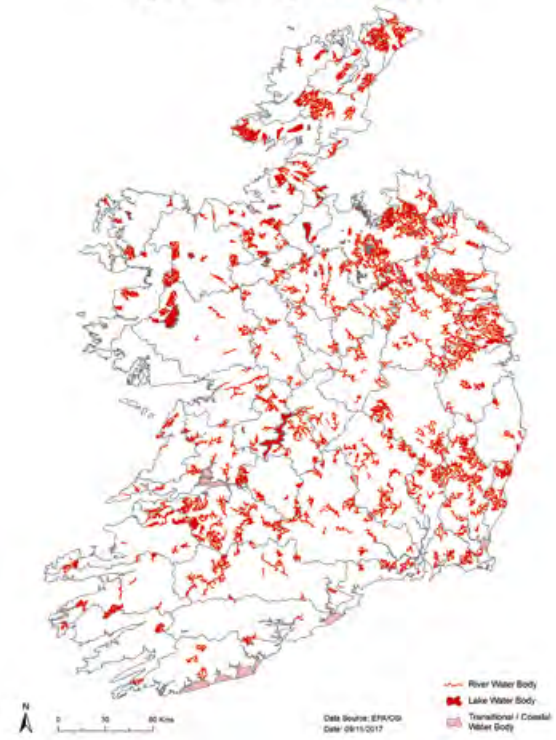
The overall potential impact on the supporting flow and level conditions for rivers and lakes that is posed by known water abstractions is low. This supports the findings of the risk assessments undertaken in 2008 for the first river basin management planning cycle.

Nationally, abstractions from 137 (4% of 3,192 total[16]) river water bodies, 76 (9% of 812 total[1]) lakes and 41 (8% of 513 total[1]) groundwater bodies have been identified for further assessment to determine if those abstractions are having a significant impact on the supporting flow and level conditions needed to support river and lake ecology.

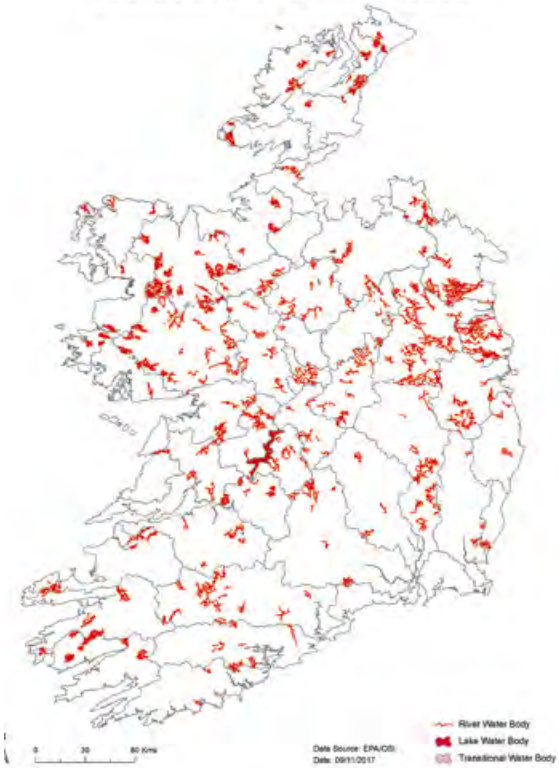
It should be noted that these initial assessments are conservative as they relate to potential impact, whereas the actual level of ecological impact on the river or lake ecology is likely to be less. All 254 water bodies needing further assessment require local assessments of their hydrological regimes. Where abstractions are found to be a significant pressure, an assessment of the ecological condition of the river or lake should take place at both the abstraction location and in water bodies immediately downstream of the abstraction location. This will be achieved by improving flow estimates in these water bodies, undertaking more detailed assessments where the flow is regulated — controlled by dams, for example — and by gathering and examining ecological monitoring data.

16 Designated WFD water bodies, as per EPA 2010 – 2015 Water Quality in Ireland report (http://www.epa.ie/pubs/reports/water/waterqua/Water%20Quality%20in%20Ireland%202010-2015.pdf)

At Risk Water Bodies where
Agriculture is a Significant Pressure



At Risk Water Bodies where
Hydromorphology is a Significant Pressure



At Risk Water Bodies where
Waste-Water is a Significant Pressure

At Risk Water Bodies where
Forestry is a Significant Pressure

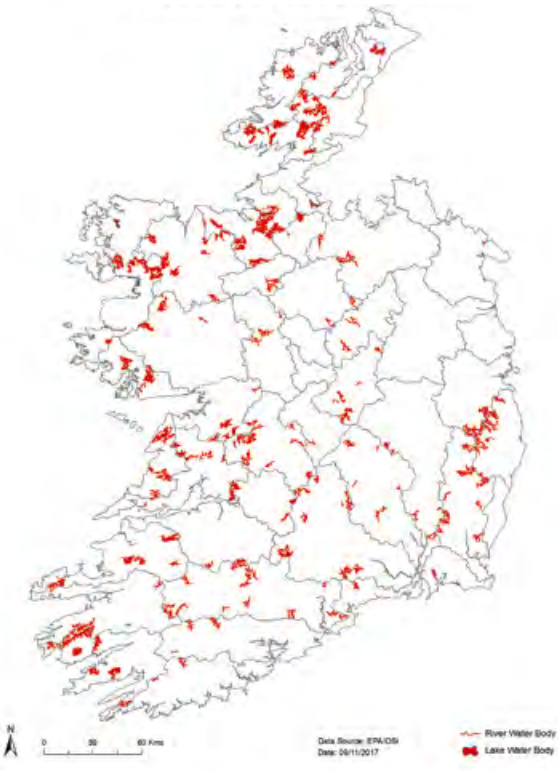
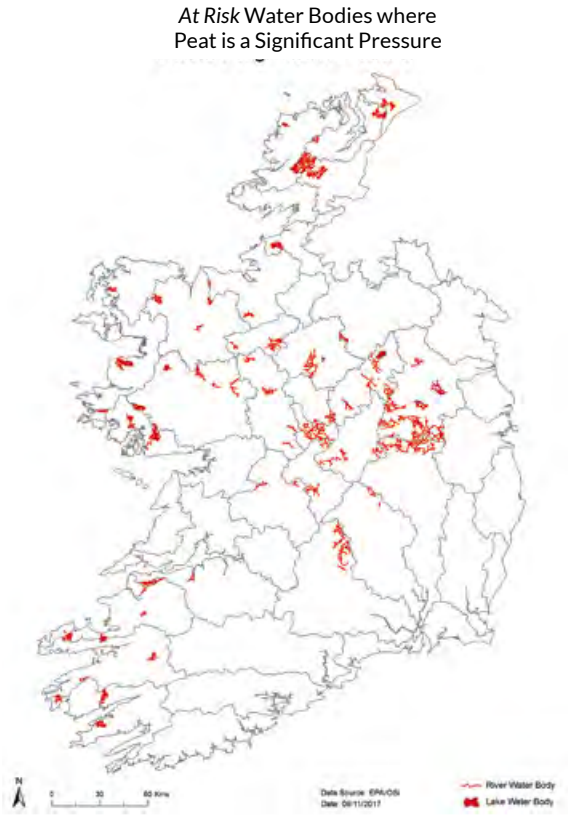


Figure 5.3 - Maps showing location of significant pressures impacting surface waters for a) Agriculture, b) Hydromorphology, c) Urban Waste-Water, d) Forestry and e) Peat extraction. (next page) (Note: These are based on risk assessments completed to date).



5.3.3 High-Ecological-Status Water Bodies: Significant Pressures

Of the 1,460 water bodies identified as *At Risk* of not meeting their environmental objectives, 127 are *At Risk* of not meeting the objective of high ecological status. This consists of 112 rivers, 12 lakes, 2 coastal water bodies and 1 transitional water body. The risk profile is different to the general risk profile across water bodies nationally, reflecting the presence of these water bodies — typically in upper catchment areas. Forestry is a significant pressure in 51 (40%) of these water bodies, followed by hydromorphology in 43 (34%) water bodies, agriculture in 35 (28%) water bodies, peat extraction or disturbances in 16 (13%) water bodies and domestic waste-water in 13 (10%) water bodies (Figure 5.4).

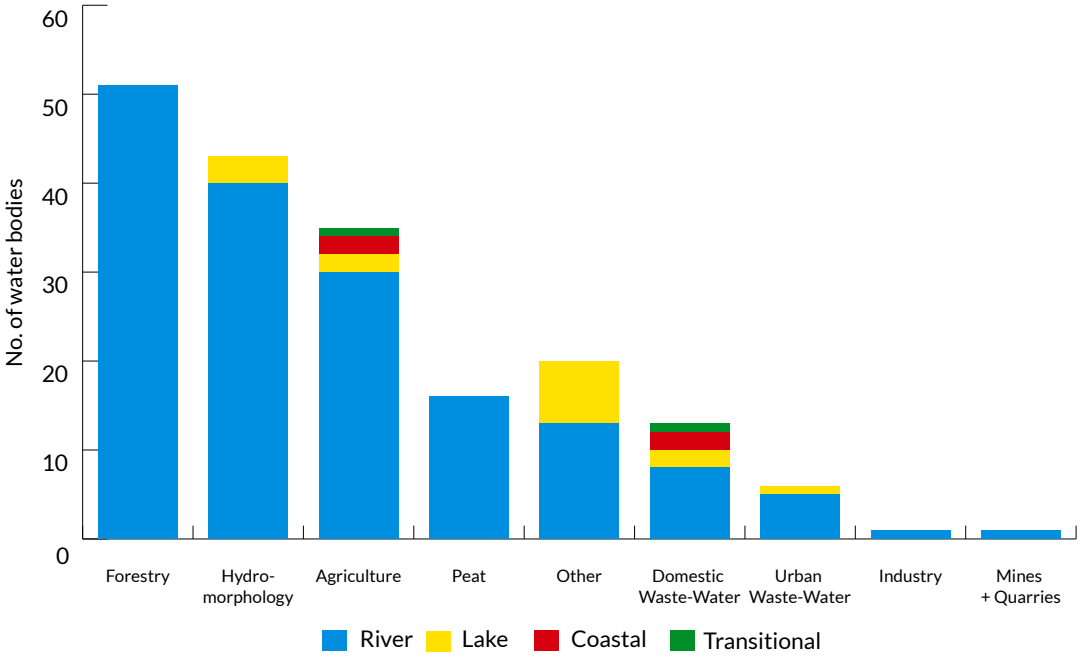


Figure 5.4 - Significant pressures impacting water bodies with high ecological status objectives

5.3.4 Water Dependent Protected Areas in SACs: Significant Pressures

Approximately 800 water bodies encompass protected Natura 2000 sites with water-dependent habitats and species. At present, 195 of these are not meeting the required water supporting conditions.

Agriculture is a significant pressure in 80 (41%) of these water bodies, followed by hydromorphological pressures in 59 (30%) water bodies, forestry in 44 (23%) water bodies, and urban waste-water in 40 (20%) water bodies. "Other" accounted for 40 (20%) water bodies and included abstractions, anthropogenic pressures, invasive species, historically polluted sites and unknown pressures (Figure 5.5).

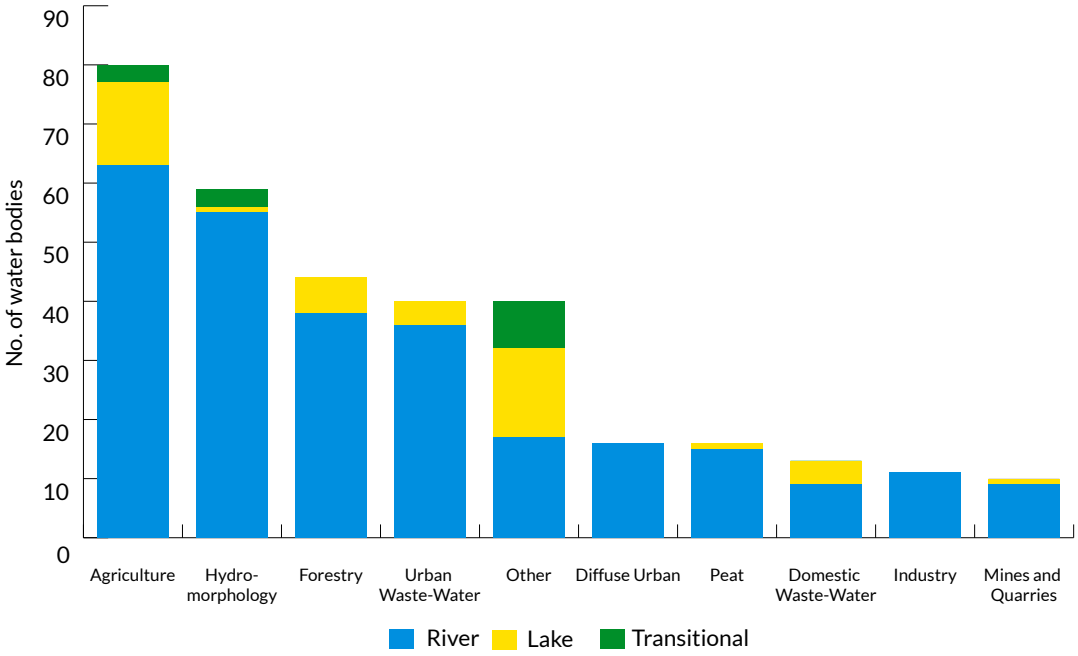


Figure 5.5 - Significant pressures impacting water bodies in water-dependent Natura 2000 sites

Section 6: Environmental Objectives of the Water Framework Directive

The Water Framework Directive (WFD) sets out the environmental objectives which are required to be met through the process of river basin planning and implementation of those plans. Specific objectives are set out for surface water, groundwater and protected areas. The challenges that must be overcome in order to achieve those objectives are very significant. Therefore, a key purpose of the *River Basin Management Plan* (RBMP) is to set out priorities and ensure that implementation is guided by these priorities.

6.1 Environmental Objectives Set Out in the water Framework Directive

Article 4 of the WFD sets out the Directive's environmental objectives in detail, considers how those objectives will be best achieved and identifies possible exemptions from the objectives. The WFD objectives for the different categories are as follows:

For Surface Waters:

- To prevent deterioration of the status of surface waters
- To protect, enhance and restore surface waters, with the aim of achieving good status (ecological and chemical) for all water bodies
- To protect and enhance heavily modified water bodies and artificial water bodies in order to achieve good ecological potential and good chemical status for those water bodies
- To progressively reduce pollution from priority substances and cease or phase out emissions, discharges and losses of priority hazardous substances into surface waters

For Groundwater:

- To prevent deterioration of the status of groundwater
- To protect, enhance and restore all bodies of groundwater and ensure a balance of abstraction and recharge, with the aim of achieving good groundwater status (quantitative and chemical)
- To reverse any significant and sustained upward trends in the concentration of pollutants in groundwater

For Protected Areas:

- To achieve compliance with objectives and standards under which the individual protected areas have been established

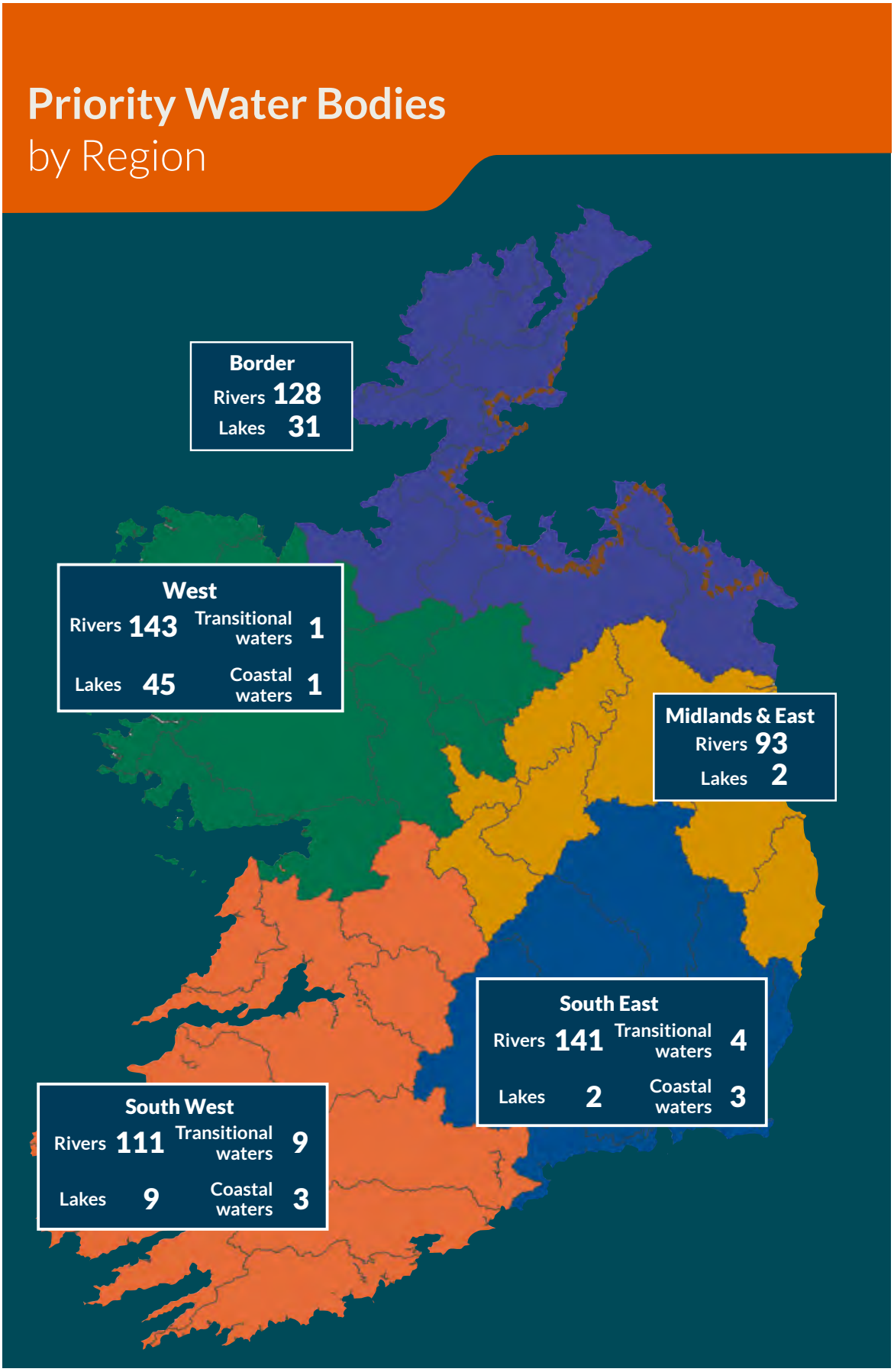
6.2 Prioritisation for the Second-Cycle River Basin Management Plan

Very significant challenges must be overcome in order to achieve the objectives that are clearly set out in the Directive. Therefore, a key purpose of this Plan is to set out priorities and ensure that implementation of this Plan is guided by this prioritisation.

In line with the above, and with the characterisation work undertaken to date by the Environmental Protection Agency (EPA), the following prioritisation was decided upon for this cycle of the Plan:

- Ensure full compliance with relevant existing EU legislation
- Prevent deterioration
- Meet the specific water-related objectives required for our protected areas
- Specifically protect and restore our high-status objective water bodies
- Prioritise catchment areas for action that facilitates (1) the targeting of water bodies where evidence suggests they could achieve status improvements during this cycle and (2) the progression of pilots in sub-catchments with more complex issues that require multi-disciplinary and cross-agency approaches
- Work to improve our knowledge and understanding of hydromorphology and barriers as pressures impacting on water quality, including the identification of the scale of these issues; build the expertise necessary to address these issues

6.3 Prioritisation Process and Outcomes



Surface Waters

The water bodies identified in Section 5 as being *At Risk* of not achieving their environmental objectives need to have targeted measures implemented to achieve their objectives under this Plan. The manner and the timeframe in which these targeted measures are implemented need to be prioritised to take account of any further characterisation work needed, of the finite resources available and of the time and resources needed to develop appropriate measures. During the development of this Plan, a prioritisation exercise was undertaken by the local authorities, the EPA and other stakeholders to identify those water bodies that require immediate action within this plan cycle to 2021. During the catchment characterisation, the EPA identified those water bodies either *At Risk* of not achieving their objectives or *Under Review*. Led jointly by the EPA and the Local Authority Waters and Communities Office, a collaborative workshop process involving senior local authority personnel and all relevant stakeholders was set up to identify, at a regional level, those waterbodies that should be prioritised for action during this planning cycle. This process was based on the priorities outlined in this section, on the evidence from the characterisation process and on the data and knowledge of public authority personnel. The outcome of this prioritisation process was the selection of 190 areas for action across the 5 local authority regions. Within these 190 areas, a total of 726 water bodies were selected for initial actions during this RBMP cycle.

Protected Areas

The Areas for Action include some water bodies on the basis that their protected-areas objectives have not been met. Of the 505 such water bodies within protected areas (and including those with high-status objectives), 202 have been included in the Areas for Action and will be subject to specific measures under this Plan to achieve their protected-areas objectives. These measures are outlined in more detail in Section 8 of the Plan.

Groundwaters

Groundwater bodies were excluded from the water bodies outlined in Table 6.3 above for a number of reasons. Firstly, approximately half of all groundwater bodies *At Risk* of not achieving their environmental objectives are associated with EPA-licensed facilities/installations, and measures to remediate the problems are managed through the EPA's licence enforcement process. Secondly, most of the remaining groundwater bodies *At Risk* are classified as such due to their contributions to *At Risk* surface water bodies. On the basis that measures to address these surface waters will include measures to address pressures on the groundwater, these groundwater bodies are not included in the list of 726 water bodies in the Areas for Action.

6.4 Water Bodies Outside the Areas for Action

There are 832 water bodies identified as being *At Risk* of not achieving their environmental objectives under this Plan that have not been included in the Areas for Action. For most of these water bodies, targeted actions will be undertaken in the third cycle RBMP from 2021-2027. While these water bodies will be subject to many of the measures identified in Sections 7 and 8 of this Plan during this plan cycle, the more detailed investigative assessments will not take place, and the water bodies will not be included in the work programmes being developed by the Regional Operational Committees for the Areas for Action.

Similarly, for-review water bodies outside the Areas for Action (of which there are 896), no specific targeted measures will be put in place during this planning cycle; however, continuous monitoring will be undertaken to further refine the risk assessment of water bodies in advance of the third-cycle Plan.

Section 7: Measures to Protect and Improve Our Water Bodies

As outlined in Section 5, the significant pressures impacting on water bodies were classified into 14 categories. This section outlines the measures aimed at addressing these pressures. It focuses on the main measures that will achieve progress across the River Basin District (RBD), and also outlines how more local, catchment- and water body-specific supporting measures will be developed and implemented. Table 7.1 sets out the significant pressures on *At Risk* water bodies. It also indicates the subsection in which the proposed programme of measures to address each significant pressure is presented.

	Significant Pressure	Category of Measure	Subsection
1	**Agriculture**	Address pressures from rural diffuse & point sources	**7.1**
2	**Domestic Waste-Water Systems**		
3	**Urban Waste-Water**	Address pressures from urban waste-water & urban runoff	**7.2**
4	**Urban Runoff**		
5	**Forestry**	Address pressures from forestry	**7.3**
6	**Extractive Industry**	Address pressures from harvesting of peat	**7.4**
7	**Invasive Species**	Protect water bodies from invasive species	**7.5**
8	**Physical Modification**	Improve physical condition of water environment	**7.6**
9	**Abstractions/Diversion**	Address abstraction pressures	**7.7**
10	**Other Pressures**	Water and Land-Use Planning Assessment and Management of Flood Risks Climate-Change Adaptation National Lead Strategy for Drinking Water Hazardous Chemicals in the Aquatic Environment	**7.8**

Table 7.1 - The significant pressures on *At Risk* water bodies and category of measures aimed at addressing those pressures.

7.1 Addressing Pressures from Rural Diffuse and Point-Source Pollution

Primary agricultural production and domestic waste-water treatment systems are key sources of rural diffuse and point-source pollution. The catchment characterisation process found agriculture to be a significant pressure in approximately 53% of *At Risk* water bodies. Excess nutrients; chemicals, including those used in pesticides; and sediment loss due to poor land management have all been identified as likely pressures in certain water bodies. Domestic waste-water treatment systems were also identified as a further significant pressure in a rural context, with 11% of *At Risk* water bodies impacted by this pressure.

7.1.1 Domestic Waste-Water Treatment

The existing Domestic Waste-Water Treatment Regulations and associated inspection regime, which are set out in greater detail in Section 3, will continue to be an important measure over the period of the second cycle. The Environmental Protection Agency (EPA) has responsibility for developing and overseeing a national inspection plan to support the regulations.

In 2013 the EPA prepared the first National Inspection Plan (NIP) for Domestic Waste Water Treatment Systems (DWWTSs), which covered the period 2013–2014. The Plan required local authorities to undertake a minimum of 1,000 inspections each year across the country. The EPA developed a risk-based methodology to assist the local authorities with the selection of locations for inspections. The methodology took into account the potential risks that DWWTS pose to both human health and water quality.

The EPA made minor adjustments to the methodology for the NIP 2015–2017 to take account of additional data which became available for bathing waters; high-status rivers; high-status-lake-catchment areas and shellfish-designated areas. These adjustments recognise the particular sensitivity of these water categories to the cumulative impact of pollution from defective DWWTSs.

The most recent EPA report on progress during 2016 in implementing the NIP for DWWTSs indicates that 1,110 inspections were carried out that year and that 49% (544) of the systems inspected failed. Of these, 29% (158) failed due to operation and maintenance issues, and 24% (131) failed due to lack of desludging. These failures can be addressed through maintenance works and do not require structural remediation. Structural remediation will, however, be required for 29% (158) of the systems that failed their inspections.

The EPA recently consulted on the third NIP covering the period 2018–2021. An updated risk-based methodology, based on improved information, has been developed for the selection of sites for inspection. The EPA will continue to oversee the implementation of engagement and awareness activities by the local authorities and other key stakeholders.

A grant scheme is currently available to assist owners of premises connected to DWWTS with the costs of repairs to, and upgrading or replacement of, such treatment systems, where the works arise directly from an inspection carried out under Part 4A of the Water Services Act 2007 (as inserted under the Water Services (Amendment) Act 2012), and the subsequent issue of an Advisory Notice by the local authority.

For the purpose of supporting and strengthening this River Basin Management Plan (RBMP), the Scheme will be extended so as to make the grant available (1) to households with defective DWWTSs located within High Status objective catchments and (2) to households in Areas for Action where, in the course of catchment investigations undertaken by local authorities, defective DWWTS are identified.

7.1.2 Domestic Waste-Water Treatment Systems — Principal Actions for the 2nd Cycle

Principal Actions	
1	The National Inspection Plan for Domestic Waste Water Treatment Systems (2018–2021) will drive improvements in the performance of systems, with over 4,000 inspections being carried out by local authorities over this period.
2	The Domestic Waste Water Treatment Systems Grant Scheme grant scheme will be extended to strengthen uptake in sensitive areas.

7.1.3 Addressing Pressures from Agricultural Diffuse and Point-Source Pollution

Primary agricultural production is a key source of rural diffuse and point-source pollution of waters in certain areas. The catchment characterisation process found agriculture to be a significant pressure in approximately 53% of water bodies identified as *At Risk*. Excess nutrients, chemicals (including those used in pesticides) and sediment loss due to poor land management have all been identified as likely pressures in certain water bodies.

The characterisation process has identified risks based on current information and trends. Food Wise 2025, which is the report of the 2025 Agri Food Strategy Committee, sets out a cohesive, strategic plan for the development of the agri-food sector over the next decade. It is a key consideration in addressing pressures on water over this cycle of river basin planning. The Food Wise 2025 Strategy sets out ambitious industry targets to be achieved by 2025. These include increasing the value of food exports by 85% and increasing value added in the sector by 70%. The strategy also envisages a 65% increase in the value of primary production. Food Wise 2025 identifies the strategic value of the sector to rural Ireland, and the key opportunities for the sector into the future. However, it also recognises that "a significant increase in food production cannot be considered in isolation from its environmental impact" and that future food-production systems must manage and sustain our natural resources, including water.

Sustainability is, therefore, a key pillar of the strategy and is considered critical to the delivery of the strategy's objectives. A High Level Implementation Group — chaired by the Minister for Agriculture, Food and the Marine — oversees implementation of the recommendations within the strategy, including 69 sustainability-related recommendations. Furthermore, a *Food Wise Implementation Plan* has been published along with the strategy and will be an important mechanism for ensuring that, during implementation, relevant evidence is gathered to inform decisions on achieving and maintaining a sustainable agriculture sector. A Food Wise 2025 Environmental Sustainability Committee was established in 2016 to evaluate and assess the delivery of environmental sustainability and mitigation actions in the *Food Wise Implementation Plan*.

The structural changes within the sector arising from Food Wise 2025 will impact differently in different areas of the country. Areas associated with dairy production are expected to see increased animal numbers. At present, 7,000 farmers, predominantly dairy farmers, are availing of a higher stocking-rate allowance under the nitrates derogation. These derogation farmers are subject to stricter controls, such as mandatory nutrient-management planning and soil sampling, annual submission of fertiliser accounts and an increased level of field inspection.

To ensure that the objective of sustainable growth is achieved, innovative changes within the sector are needed, and these will require monitoring to assess their impacts. To respond to this challenge, a new targeted Sustainability Support and Advisory Programme is being put in place for the 2nd cycle RBMP to respond to the aforementioned emerging pressures (see Section 7.1.5).

7.1.4 High-Level Actions to Address Rural Diffuse and Point-Source Pollution

As set out in detail in Section 3, the Nitrates Regulations and associated Nitrates Action Programme (NAP) are the basic measures that this RBMP sets out for the protection of waters from pollution from agricultural sources. The primary focus is on preventing and reducing water pollution from nutrients (nitrogen and phosphorus) arising from agricultural sources. However, other complementary supporting measures are also necessary to further reduce pollution from agricultural sources. These complementary supporting measures are outlined below and include (1) knowledge-transfer initiatives to promote the adoption of best environmental practices (2) the Rural Development Programme (RDP) 2014–2020 (3) the Agricultural Catchment Programme (ACP) and (4) monitoring and modelling initiatives to assess the impact of sectoral changes on water quality.

The provisions of the Nitrates Regulations and the associated measures outlined in the NAP will set the minimum environmental baseline that all Irish farmers must achieve. The Regulations were revised in December 2017 (S.I. 605 of 2017) following a review of the NAP. The new (4th) NAP includes measures aimed at further strengthening the protection of water and attaining a level of soil fertility that is consistent both with efficient agricultural production and with effective water-quality protection. The new measures — which include fencing off cattle to protect watercourses, distancing of drinking points from watercourses and prohibiting direct discharges to watercourses from farm roadways — also focus on intercepting and breaking nutrient-transport pathways and preventing sediment and nutrient losses to waters.

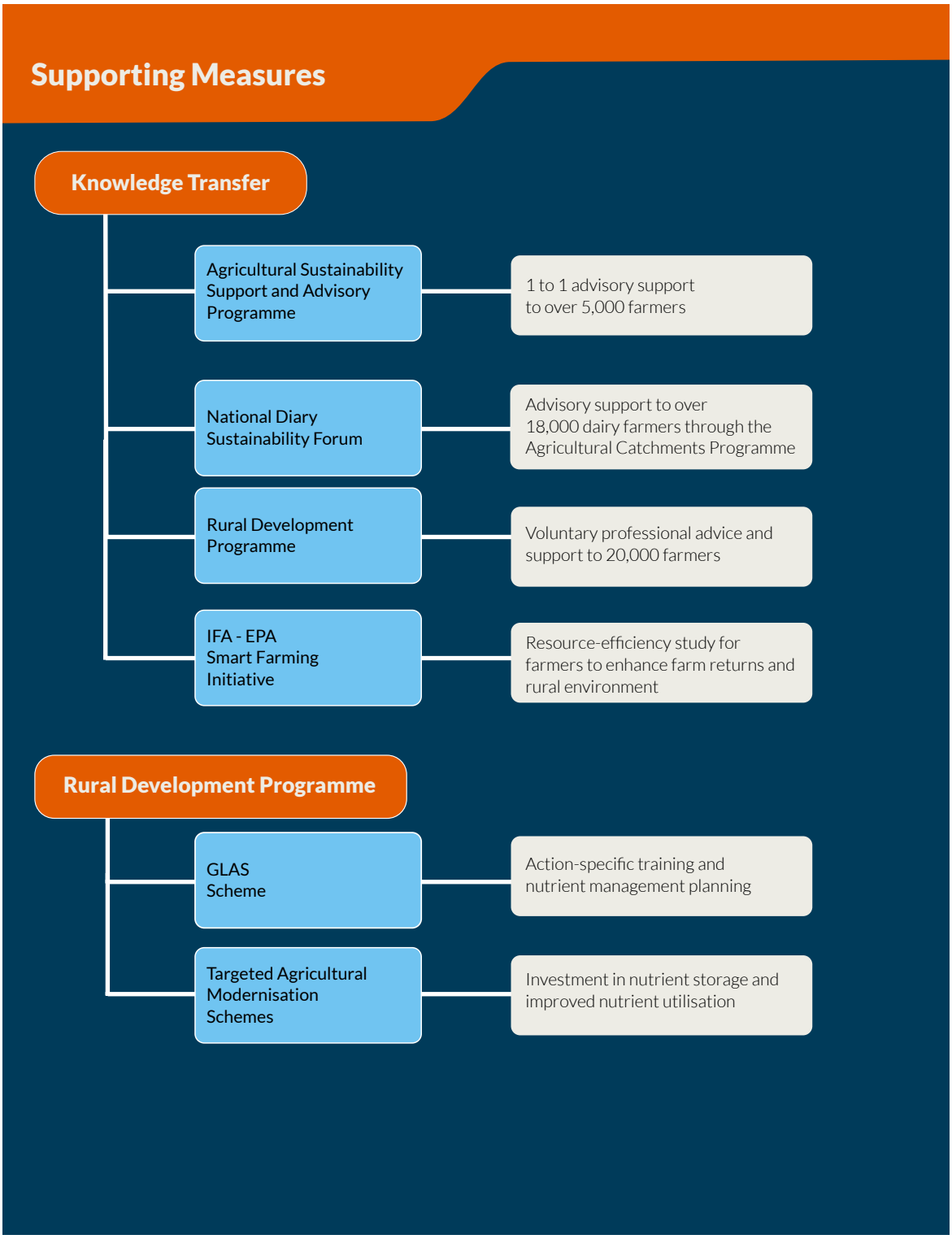
All of this represents a major development beyond the 3rd NAP. Additional requirements placing limits on the application of fertiliser on high-organic-content soils are also aimed at affording additional protection to sensitive areas, particularly Natura 2000 sites.

The integrated Governmental approach to the enforcement of the new NAP (2018–2021) will be maintained and strengthened. The inter-agency/inter-departmental Water Quality and Agriculture working group will ensure increased targeting of inspections by local authorities based on water-quality results and the outputs of the RBMP characterisation process (as set out in Section 5).

While the above-mentioned changes represent important incremental improvements to the action programme, a key recommendation of the NAP Review Group was the introduction of a collaborative approach, focused on changing behaviours at farm level. The Group's view was that the adoption of such a collaborative approach had the greatest potential for improving implementation of the NAP at farm level and for achieving further significant improvements in water quality. In 63 submissions from the RBMP consultation process and in numerous submissions made to the NAP consultation process, a targeted and collaborative approach was recommended as an important additional means of promoting best environmental practice. A number of submissions from the NAP consultation process also favoured such an approach. Following consideration of the NAP Review Group recommendations and of the public submissions, a new collaborative approach was developed and launched in November 2017. This approach is outlined in Section 7.1.2.

Two other statutory agricultural measures are detailed in Section 3: the Pesticides Regulations and the Agriculture Environmental Impact Assessment Regulations. The former provides for compulsory registration and training of professional users of pesticides, and for restrictions/safe guard zones — especially surrounding drinking-water abstraction points. The latter provides for an EIA screening and consent process for farmers with regard to such activities as land drainage works. These statutory measures will continue to be important over the period of the second cycle. Section 8.1, which addresses drinking-water source protection, describes the new collaborative strategy being adopted to protect drinking-water sources from pesticide contamination. This strategy will work in conjunction with the Pesticides Regulations. With regard to the Agriculture Environmental Impact Assessment Regulations, guidance relating to land-use planning and river basin management planning (see Section 7.8.1) will be introduced. This guidance will strengthen the implementation of the regulations.

7.1.5 Supporting Measures for Agricultural Diffuse and Point-Source Pollution



In addition to the high-level regulatory actions that are currently being taken, which will continue and evolve during this second cycle, four key supporting measures will be implemented:

- Knowledge-transfer initiatives and the widespread adoption of best practice
- Targeted agri-environment schemes under the Rural Development Programme 2014–2020
- The Agricultural Catchments programme
- Monitoring of sectoral changes and "modelling" of water quality impacts

Promoting the Adoption of Best Environmental Practice through Knowledge-Transfer Initiatives

Effective "knowledge exchange" is seen by all stakeholders as the key to ensuring that best environmental practice is achieved on farms. Better nutrient management and management of environmental risks on a widespread basis provide the opportunity for more positive outcomes than regulatory drivers alone. Through knowledge transfer, the long-term target will be to support all of the farmers who work Ireland's 130,000 farms in the adoption of best practice. As we move towards this objective, a new collaborative initiative is also being put in place during the second cycle of the RBMP. This collaborative initiative will promote the implementation of best practice (1) in 190 prioritised Areas for Action in order to address existing environmental pressures (see section 10) and (2) across the dairy sector through the Dairy Sustainability Initiative.

The Sustainability Support and Advisory Programme

The new collaborative approach called "The Sustainability Support and Advisory Programme", jointly approved by the Department of Housing, Planning and Local Government (DHPLG) and the Department of Agriculture, Food and the Marine (DAFM), will be implemented from 2018 to 2021 with the support of Dairy Industry Ireland (DII). This is an innovative collaboration between Government and industry. The objective of the new approach is to encourage and support behavioural change, facilitate knowledge transfer and achieve better on-farm environmental outcomes. The Programme will draw on the experience and resources of key sectoral and industry stakeholders including the two Departments, the local authorities, the dairy co-ops, Teagasc, Bord Bia and the farm organisations.

A broader group of agencies and stakeholders will advise and contribute to the implementation of the programme. A total of 30 sustainability advisers will be assigned to the programme, 20 of whom will be located in Teagasc, while 10 will operate within the dairy processors' organisational structures. A joint management team drawn from Teagasc, the local authorities and the dairy co-ops/Dairy Sustainability Initiative will co-ordinate and direct the work of all the sustainability advisers across the programme.

The 20 sustainability advisers embedded within Teagasc will support the local authority-led priority Areas for Action programme. The Teagasc advisers will offer a free one-to-one sustainability advisory service to over 5,000 farmers who manage lands containing high-risk "critical source areas" (CSAs). The CSAs have been identified by local authorities, with technical support from the EPA (see section 10). Each individual farmer in these areas will have access to a highly trained sustainability adviser, who will provide one-to-one support and assistance in drawing up an individual sustainability action plan for their farm. The sustainability advisers will work collaboratively with all of the other farm advisers and stakeholders in their region to ensure that the work programme delivers the best possible outcome for the area in relation to water quality. All of the advisers — both Teagasc and co-op based — will work in partnership with the local-authority regional water quality support teams as described in Section 10. There will also be close cooperation between the co-op and Teagasc-based advisers where dairy farms are located in CSAs. All of the advisers will also support the Programme by organising events aimed at increasing awareness of the activities within catchments and at improving farmer buy-in and uptake practices to improve water quality. Engagement with local stakeholder groups will be extremely important in this regard.

The 10 dairy processor-based sustainability advisers will lead the rollout of the Dairy Sustainability Initiative (see below) — a change programme for the dairy processors' supply base. The programme will focus on best practice in Nutrient Management Planning (NMP), on supporting development and effective management of farmyards and roadways and on supporting best-practice adoption in CSAs. Initially, this Initiative will involve the establishment of 12 pilot projects involving 360 farmers and will focus on the adoption of best practice in sustainable dairy production in relation to water quality, gaseous emissions and biodiversity. During the period of this Plan up to 2021, the co-ops will promote and support sustainability through their structures, promoting best practice in farming and in nutrient-management processes across all of their 18,000 suppliers.

Preparatory work has commenced, and an overall strategic and operational work plan is being developed by the programme management team, which consists of representatives from Teagasc, local authorities and the co-ops' Dairy Sustainability Initiative.

Teagasc will also lead a national Agricultural Water Quality Campaign, which will become part of the overall Sustainability Support and Advisory Programme. This will harness the resources across a range of Teagasc business units.

National Dairy Sustainability Forum

The dairy industry is the sector with the most potential for growth in output, and achievement of this potential would contribute to the aims of Food Wise 2025. All stakeholders, from farmer to industry to Government recognise the need to ensure that this expansion is sustainable. To ensure future sustainability a joint industry/farmer/government forum – the National Dairy Sustainability Forum – was established by the Irish Dairy Industry Association in 2016. The Forum subsequently introduced the Dairy Sustainability Initiative. The Initiative will drive the development and rollout of a targeted knowledge-transfer programme to effectively act on the key lessons that have been learned from the ACP and also to bring about soil-fertility improvements on dairy farms. The Sustainability Support and Advisory Programme will be critical to supporting the Dairy Sustainability Initiative.

Membership of the Forum is drawn from the key sectoral and industry stakeholders, with participation from Bord Bia, dairy co-operatives, farm organisations, Teagasc, the DHPLG and the DAFM, local authorities and the EPA.

It is envisaged that the Dairy Sustainability Initiative will be part of an evolution of the existing Origin Green scheme, promoting the sustainable development of the sector, and providing benefits in terms of economic viability, water quality and climate impact.

Wider knowledge Transfer and Adoption of Best Practice

A budget of €100 million has been allocated from the RDP for a programme aimed at the adoption of best practice through knowledge transfer, and the full implementation of this measure is a recommendation of the Food Wise 2025 strategy. The purpose is to upskill farmers and agricultural advisers. To promote the development of a more sustainable agri-sector, specific advice will be provided on environmental, bio-diversity and climate-change issues. This voluntary programme will roll out professional advisory and knowledge-transfer services to 20,000 farmers across all sectors. It will ensure that those farmers who obtain the services are engaged with the programme and that they will adopt the plans and practices proposed by the advisory service.

To further support good nutrient management across the entire country, an online NMP system has been launched by Teagasc and made available to all Farm Advisory System (FAS)-approved planners. This tool is unique in Europe and will promote and encourage efficient fertiliser use at a national level, which means that it will reach those farms not addressed by the other knowledge-transfer actions. Use of this system will be mandatory for farmers in the Green, Low Carbon, Agri-Environment Scheme (GLAS) and for derogation farmers, accounting for almost 60,000 farmers. Its core enhancement is translating nutrient management into pictorial presentation at field level with colour-coded identification of field-nutrient status.

Smart Farming Collaborative Initiative

Smart Farming (smartfarming.ie) is a voluntary programme led by the Irish Farmers' Association, in conjunction with the EPA. The programme collates existing resource-efficiency knowledge and expertise from Ireland's leading academic and advisory bodies, state agencies and technical institutions. The key objective of collating this knowledge and expertise is to deliver on the double dividend of improving farm returns and enhancing the rural environment.

Each farmer who participates in the Smart Farming Programme receives a resource-efficiency study for their farm. This study identifies ways to improve farm returns and enhance the rural environment. In 2017 the average cost saving on participating farms was €8,700, and a 10% reduction in greenhouse gas emissions was identified.

Almost 50% of the cost savings found on participating farms are linked to reduced use of concentrates. This is because, when soils are at optimum fertility levels, there is a reduced risk of nutrient losses and an increased uptake of these nutrients by crops. Therefore, when low soil-fertility levels on farms are addressed, grass growth is often improved too.

During this river basin management planning cycle, Smart Farming will collaborate with Local Authority Waters and Communities Office officers to share best practice with farmers on ways to break the nutrient pathway between source and water courses. Smart Farming will work with University College Dublin to develop decision-support tools to assist farmers in interpreting water-quality test results in a timely way and, where necessary, will provide advice on corrective action.

The focus of the Programme will continue to be on supporting farmers to reduce greenhouse gas emissions and improve nutrient planning.

To deliver this, all famers who participate in the Smart Farming Programme will have their soils tested and receive information on soil- fertility levels, pH levels and fertiliser requirements. The water quality of domestic wells will also be analysed.

To support the sharing of learning, case studies will continue to be uploaded onto the programme's website: smartfarming.ie. This will help farmers to continue to play their part in improving the rural environment.

Rural Development Programme (RDP) 2014–2020

With an enhanced focus on delivery of good environmental outcomes, a more "targeted" approach has been taken to the current RDP. The RDP 2014–2020 consists of a suite of measures designed to enhance the competitiveness of the agri-food sector, achieve more sustainable management of natural resources and ensure more balanced development of rural areas. The allocation for RDP 2014–2020 amounts to almost €4 billion, of which €2.19 billion is funded by the EU. A more targeted approach to this current programme has been adopted, with an enhanced focus on delivering positive environmental outcomes. There is a strategic focus on water-quality objectives, and two targeted agri-environment schemes under the RDP — GLAS and the Targeted Agriculture Modernisation Scheme (TAMS) — have important roles as supporting measures to improve water quality.

Green, Low Carbon, Agri-Environment Scheme (GLAS)

GLAS is a targeted agri-environment scheme under the RDP, with a budget of €1.4 billion for the period 2014–2020 and 50,000 participating farmers. The objective of the scheme is to improve the rural environment by improving water quality, mitigating climate change and promoting biodiversity. Actions taken to date — including fencing of watercourses (16,600 km) as well as the promotion of more widespread low-input farming (284,000ha.) and growing of catch crops (25,000 ha.) — are examples of key interventions at farm level that support the delivery of the next phase of river basin planning. To receive full payment under the terms of the scheme, participating farmers must engage a trained agricultural adviser, participate in action-specific training and have an NMP in place. Unlike previous agri-environmental schemes that provided equal access to all farmers, GLAS prioritises farms in specific areas by means of key actions. Prioritisation of farms within vulnerable catchments and high-status water bodies is a key feature of the GLAS programme.

Targeted Agricultural Modernisation Schemes (TAMS)

The TAMS provides grant assistance to farmers for investments related to the pig and poultry sectors, dairy equipment and the storage of slurry, soiled water and other farmyard manures. Funding of €395m has been allocated to these investments, which will leverage a further €500–600 million in investment by farmers. Of the €395 million, €190 million is specifically targeted at two schemes which form part of the TAMS: the Animal Welfare, Safety and Nutrient Storage Scheme and the Low Emission Slurry Spreading Scheme. Over the period of the next river basin planning cycle, these will lead to a significant investment in nutrient storage, and to improved nutrient utilisation. Increased purchase of low-emission spreading equipment will increase the volume of slurry that will be spread using this equipment, providing an opportunity to improve the utilisation of nutrients in manure and to offset chemical-fertiliser use on more intensive farms. It is expected that the Sustainability Support and Advisory Programme (Section 7.1.5) will promote the targeted uptake of the TAMS schemes in high-risk areas.

Other RDP Schemes

A focus on "bottom-up" approaches to delivery of environmental objectives is supported through the assignment, under the programme, of €70 million to what are termed "locally led" schemes. This approach builds on the experience gained in implementation by DAFM of the internationally acclaimed "Burren Farming for Conservation Programme" project. Supporting the next phase of river basin plans, a locally led Freshwater Pearl Mussel (FPM) Scheme, targeting 8 priority Freshwater Pearl mussel sites and costing approximately €10 million, is to be launched in early 2018. Full details of this scheme are provided in Section 8, which deals with measures to meet our protected-area objectives.

Agricultural Catchments Programme (ACP)

The ACP will work with over 320 farmers across 6 catchments to evaluate the environmental and economic effects of the NAP measures implemented under the Nitrates Directive. The outputs of this programme show that good nutrient- and farm-management practices can reduce phosphorus source pressure while maintaining high production levels. The ACP has also shown that behavioural change that brings about positive impacts can be secured by, for example, changing the timing of slurry application to better match the peak growing season. This enhances nutrient uptake, limits losses to water and delivers improved nutrient-

use efficiency, thereby reducing losses of nitrogen and phosphorus to waters. Knowledge exchange and the general facilitation of information sharing are seen as key to ensuring the adoption of best practice. Transferring lessons learned from the ACP to all farms is central to the Sustainability Support and Advisory Programme (Section 7.1.5).

Monitoring Sectoral Changes and Modelling Water-Quality Impacts

It is accepted that Ireland faces significant challenges in meeting water-quality targets while increasing production in the agricultural sector. The Food Wise 2025 strategy prioritises the sustainability of production systems and the need for monitoring of any environmental risks and impacts. The implementation of catchment characterisation by the EPA and the Food Wise 2025 Implementation Plan — along with intensive monitoring, through the ACP, of socio-economic and bio-physical data (including data on soil-nutrient status, hydrology, hydrochemistry, ecological status, land use, nutrient management and associated costs within specific river catchments) — will provide a platform for monitoring and modelling any potential risks or impacts under Food Wise 2025.

The ACP plays a pivotal role in investigating the scientific basis for the development of targeted mitigation initiatives, where necessary, to deliver the sustainability pillar of the Food Wise 2025 Strategy which is critical to its success. The ACP is developing an integrated environmental-economic modelling system (FARMSCOPER) to identify the impacts of expansion under Food Wise 2025 and to advise on the overall costs and benefits associated with sustainable intensification practices at field, farm and catchment scales. FARMSCOPER is a tool for farm-scale calculation of pollutant losses, built on a source model and allowing for optimisation of measures to meet targeted nutrient reductions at minimum costs. New targeted initiatives will be developed as necessary to ensure that the sustainability objectives of Food Wise 2025 are met.

7.1.6 Agricultural Diffuse & Point-Source Pollution — Principal Actions for the 2nd Cycle

The following sets out the principal actions for the second cycle with regard to addressing rural diffuse and point-source pollution:

Principal Actions	
1	The new, strengthened Nitrates Action Programme (2018–2021) will be the key agricultural measure for preventing and reducing water pollution from nutrients (nitrogen and phosphorus) arising from agricultural sources. It will be complimented by other supporting measures listed below.
2	The integrated Governmental approach to the enforcement of the Nitrates Action Programme (2018–2021) will be maintained and strengthened. The inter-agency/ inter-departmental Water Quality and Agriculture working group will ensure increased targeting of inspections by local authorities based on water quality results and the outputs of the characterisation process.
3	The Pesticides Regulations and the Agriculture Environmental Impact Assessment Regulations will continue to form a key part of the actions over the second cycle. These will be strengthened by other supporting measures as outlined.
4	A new collaborative initiative between Government and industry called the "Sustainability Support and Advisory Programme" has been put in place for cycle 2 (2018–2021) to support the implementation of best practice (1) in 190 prioritised Areas for Action, to address existing environmental pressures (see Section 10), and (2) across all dairy farmers through the Dairy Sustainability Initiative. A total of 30 sustainability advisers are being assigned to the programme, 20 of whom will be located in Teagasc, while 10 will operate within the dairy processors' organisational structures. The objective of the new approach is to encourage and support behavioural change, to facilitate knowledge transfer and to achieve better on-farm environmental outcomes.
5	The Dairy Sustainability Initiative — a joint industry/farmer/government forum, initiated by the Irish Dairy Industry Association — will drive the development and rollout of a targeted knowledge-transfer programme to all 18,000 dairy farms. This will effectively deliver the key lessons from the Agricultural Catchments Programme to dairy farmers. It is envisaged that this will consist of both co-operative-led farm pilot programmes and wider promotion programmes for nutrient management and management of farm pollution point sources.

Principal Actions	
6	In addition, and to promote the adoption of best environmental practice across different sectors of agriculture, €100 million has been allocated from the RDP for a knowledge-transfer programme with the purpose of upskilling farmers and agricultural advisers. Over the lifetime of the RDP, this programme will, on a voluntary basis, roll out professional advisory and knowledge-transfer services to around 20,000 farmers across all sectors.
7	Teagasc will promote best practice in water-quality protection through its discussion groups and on-farm advisory services. Teagasc will also facilitate the training of non-Teagasc advisers/consultants to facilitate the wider dissemination of water-quality advice to farmers. To further support good nutrient management across the entire country, an online nutrient-management planning system has been launched by Teagasc and made available to all Farm Advisory System (FAS)-approved planners. Use of this system is mandatory for farmers in GLAS and for derogation farmers — accounting for almost 60,000 farmers.
8	The GLAS Scheme, which is under the RDP, has a budget of €1.4 billion for the period 2014–2020. This period will see 50,000 farmers participating in the scheme and implementing actions to improve the rural environment, including actions to improve water quality. The GLAS Scheme prioritises vulnerable and high-status catchments, and has a strong focus on ensuring that farmers understand the environmental benefits of their actions. Also under the RDP, the TAMS scheme will facilitate total investment of around €500–600 million for better management and storage of animal manures, including more efficient spreading equipment. The "targeting" of these agri-environmental schemes and interventions rolled out by the DAFM will continue, responding to emerging knowledge and evidence (such as catchment characterisation).
9	It is accepted that Ireland faces significant challenges in meeting water-quality targets while increasing production in the agricultural sector, and a key recommendation of the Food Wise 2025 strategy is that the environmental impacts of the strategy should be monitored. The DAFM will work closely with relevant agencies to ensure that this monitoring takes place. In particular, the ACP programme will model and monitor the impacts of agricultural development under Food Wise 2025 in specific catchments. The ACP will develop an integrated environmental-economic modelling system to identify the impacts of expansion under Food Wise 2025 and to advise on the overall costs and benefits associated with sustainable intensification practices at field, farm and catchment scales. New targeted initiatives will be developed as necessary to ensure that the sustainability objectives of Food Wise 2025 are met.

7.2 Addressing Pressures from Urban Waste-Water

Catchment characterisation has identified 293 (20%) river, lake, transitional and coastal water bodies as being *At Risk* from urban waste-water pressures. These pressures include the discharge of inadequately treated waste-water effluent and intermittent discharges from storm-water overflows.

The priority objective for this river basin planning cycle is to secure compliance with the Urban Waste Water Treatment Directive and to contribute to the improvement and protection of waters in keeping with the water-quality objectives established by this Plan. Achieving this objective entails addressing waste-water discharges and overflows where protected areas (i.e. designated bathing waters, shellfish waters and Freshwater Pearl-Mussel sites) or high-status waters are at risk from urban waste-water pressures.

Overall, in Irish Water's investment plans, capital expenditure has been committed for 255 waste-water treatment-plant upgrades. In addition, Irish Water has begun the process of identifying new projects for the next capital-investment period which will run from 2020 to 2024. These new projects, which will be subject to revenue control by the Commission for Regulation of Utilities (CRU), have not yet been identified and have not been taken into account in predicting water-quality improvements for the purposes of this RBMP.

It is envisaged that it will take several investment cycles for Irish Water to address all of the urban waste-water pressures identified. It is also expected that new priorities will emerge over time as pressures from both human population centres and development increase. Taking this and other factors into account, Irish Water will continually review the outputs of catchment characterisation and will prioritise future investment.

7.2.1 High-Level Actions to Address Pressures from Urban Waste-Water

The EPA is responsible for authorising and regulating urban waste-water discharges. Licences are required where the population equivalent of the urban area is greater than 500, and certificates of authorisation are required for urban populations below this threshold. Authorisations include a requirement to address compliance with the Urban Waste Water Treatment Directive and, where necessary, provide for higher levels of treatment in order to achieve a water-quality objective identified in an RBMP, or in order to address the requirements of EU legislation. It is the responsibility of Irish Water to comply with the requirements of these licences and authorisations. Licence conditions may lay down requirements for operational and infrastructural improvements to both the collection and treatment systems.

Over the period of the preparation of this second-cycle RBMP, extensive effort has been made to improve the scientific evidence base, through the characterisation work undertaken by the EPA, and to identify measures, flowing from this evidence base, that will have appropriate environmental benefits. Urban waste-water discharge licences will need to be reviewed in many cases to reflect this improved evidence base and also to ensure that licences appropriately reflect the priorities and objectives of this second-cycle RBMP.

Over the period 2017–2021, Irish Water has committed to investing approximately €1.7 billion in waste-water projects, programmes and asset maintenance as approved by the CRU to date. Of this, €880 million is planned for major waste-water treatment projects[17]. While the current investment period extends up to 2021, many projects will continue and be completed beyond 2021. This is because of the significant lead-in time required to progress projects from initial approval to design stage, to procurement and, finally, to construction, commissioning and handover. The current and previous investment plans (2014–2016 and 2017–2021) include approval by the CRU for a total of 255 capital projects involving new and upgraded waste-water treatment plants. This investment addresses a broad range of urban areas. For example, 112 urban areas are above 2,000 population equivalent and 40 relate to urban areas of less than 500 population equivalent.

Improvements to urban waste-water collection systems are also provided for in the current investment period (2017–2021), with projects commencing at 41 urban areas, with a total planned investment of €349 million. In some instances, these works are necessary to address potential Urban Waste Water Treatment Directive compliance issues. However, the majority of works are aimed at ensuring that collection-system performance supports continued environmental compliance and achievement of WFD environmental objectives. In addition to improvements to collection networks, a programme of Drainage Area Plans (DAPs) for waste-water collection systems is planned for 44 urban areas over the period to 2021. The focus of these Plans is to better understand the performance and impacts of collection systems in order to identify where improvements are needed. In prioritising the urban areas chosen for DAPs, the main focus is on compliance with the Urban Waste Water Treatment Directive and on the achievement of other environmental objectives.

The remaining €465 million is planned for capital-maintenance and national upgrade programmes to be carried out on waste-water treatment plants and waste-water collection systems.

Furthermore, in line with Irish Water's *Water Services Strategic Plan*, development of a waste-water compliance strategy will commence in 2018. This Strategy will build on the plans, projects and programmes in place. It will focus on compliance with the Urban Waste Water Treatment Directive, as well as on meeting the objectives of the RBMPs, at an affordable cost and within an achievable timeline. Regulatory and river basin planning cycles and legislative requirements will therefore be aligned. The timeline for the strategy reflects the need to ensure consistency with the RBMP, as well as the importance of undertaking appropriate stakeholder consultation. The work will be evidence based, incorporating catchment assessments of discharges from Irish Water's assets and making best use of ongoing outputs from the EPA's catchment characterisation activities.

Planned Improvements in Urban Waste-Water Discharges and their Contribution to Achieving WFD Objectives

The following section sets out how Irish Water's planned capital investment in the upgrading of waste-water treatment plants and collection systems will address the priorities set out in the *River Basin Management Plan (RBMP)*. Appendix 1 lists the urban areas where capital works to upgrade water treatment plants are proposed in order to:

1. Achieve compliance with the Urban Waste Water Treatment Directive
2. Support the protection of protected areas (shellfish and bathing waters)
3. Support the protection of high-status waters
4. Support the prevention of deterioration and support targeted water-quality improvements

Although it will not be possible to address all urban waste-water pressures during the current Irish Water capital-investment cycle, these will be progressively dealt with by Irish Water on a prioritised basis during future capital-investment cycles within the framework of ongoing river basin management planning.

The 255 projects to upgrade waste-water treatment plants that are currently committed to are due to be completed by 2025. Appendix 1 gives the schedule from start date (project-approval date) through to project completion and handover. Of the 255 projects, 101 will be completed by the end of 2018, a further 87 by the end of 2021 and the remaining 67 by the end of 2025. Typically, projects can take up to 7 years to bring from initial approval to completion and handover, depending on the complexity of the project.

17 Irish Water Investment Plan 2017-2021

Of the 255 projects, 93 were already in progress when Irish Water took over responsibility for public water services on 1st January 2014. These were incorporated into the Irish Water capital programme following a review by Irish Water.

The remaining 162 projects have already commenced, or will commence in the period leading up to 2021. The number of projects commencing in each year (starting with the initial design) together with the number reaching completion is shown in the following figure:

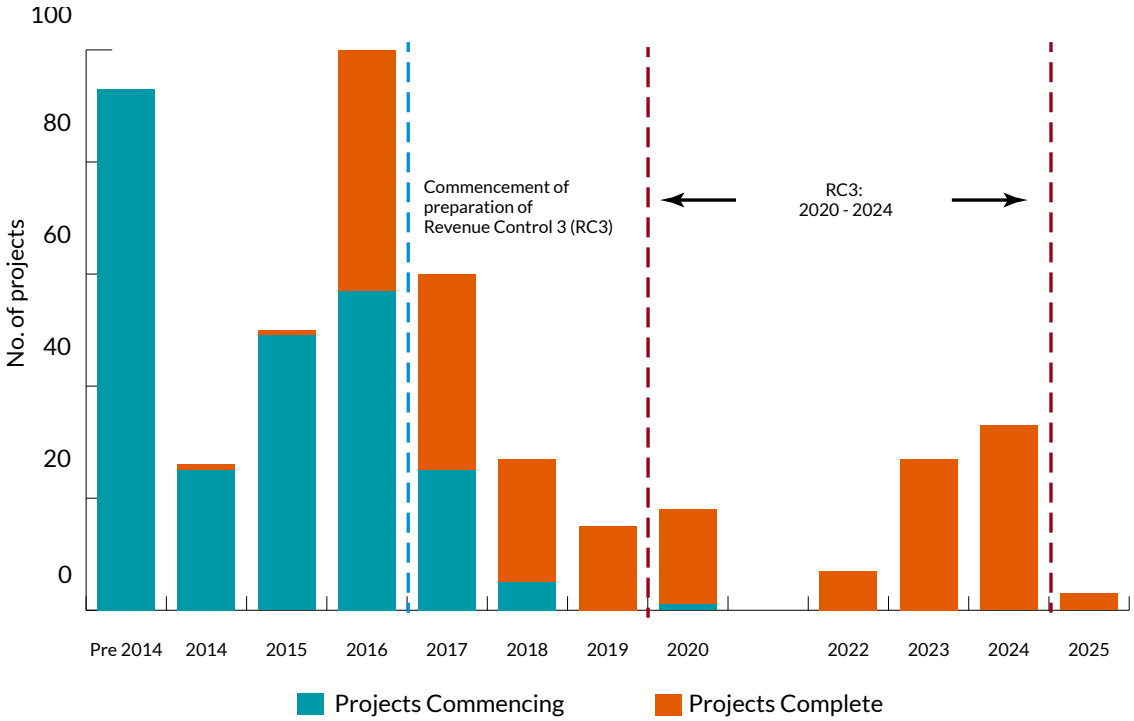


Figure 7.1 - Number of waste-water projects commencing and reaching completion each year

The above chart shows project progression for the 255 waste-water treatment plant upgrades that form a subset of overall waste-water investment in the 2014–2021 period. When this is considered along with the balance of investment in the current period, and with early planning for projects in the next investment period, we can see that there will be a steady flow of investment in waste-water upgrades through the second-cycle RBMP, and into the third planning cycle.

A conservative approach has been taken to predicting when water quality will improve, following construction and commissioning of upgraded waste-water treatment plants and other improvements to networks. Natural ecosystems can take a number of years to recover, following improvements in the quality of waste-water discharges. Therefore, for the purpose of predicting water-quality improvement, a period of up to 3 years was allowed for the improvements to be observed through water-quality monitoring programmes.

Of the 255 already committed treatment-plant projects and a further 20 planned network upgrades, 116 will contribute to water-quality improvements in 161 water bodies currently identified as being *At Risk* from urban waste-water pressures. The remaining 159 projects address expected growth needs in population centres and will contribute to preventing deterioration in water quality from pressures arising from future growth. The new waste-water projects to commence during the next investment period, 2020–2024, will contribute to further water quality improvements in the period after 2021.

Of the 116 urban areas discharging to *At Risk* water bodies, a total of 41 upgrades (35%) will have been completed by the end of 2018, and it is conservatively estimated that 12 water bodies will achieve their water-status objectives by 2021. A further 59 (51%) will be completed by the end of 2024. These upgrades will impact positively on 130 *At Risk* water bodies. This does not take into account any new waste-water treatment plant upgrades that will commence during the 2020–2024 investment period.

Achieving Compliance with the Urban Waste-Water Treatment Directive

Over the period 2016–2024, capital upgrades will have been completed or undertaken at 32 urban waste-water treatment plants to ensure that treatment levels and capacity comply with the requirements of the Urban Waste Water Treatment Directive. Operational improvements, including some minor capital improvement works, will be undertaken at 8 additional waste-water treatment plants to ensure compliance. Appendix 1 lists the schedule of capital upgrades and gives details in relation to the generated population loads and completion dates for each urban area.

Of the urban areas where works are required, the majority will be compliant by the end of 2021, including Ringsend, which is the single largest waste-water treatment plant in the country, accounting for some 41% of the total waste-water load. Of the remainder, Stamullen and Claremorris are expected to be compliant by 2023. The urban areas of Ferns and Lahinch, which are marginally above 2,000 population equivalent, have only recently been identified as requiring major capital works. As projects take a number of years to develop and bring to construction, completion of these upgrades will extend to 2023.

Contribution of Improvements in Urban Waste-Water Treatment Discharges to Other Plan Priorities

Major capital works already committed to will contribute to improving water quality in a number of other areas, including designated bathing waters, shellfish waters, Freshwater Pearl Mussel sites and high-status waters.

Designated bathing waters

Seven currently non-compliant bathing waters are impacted by multiple pressures. Irish Water is implementing measures in relation to urban waste-water pressures at four of these areas. Irish Water, together with Galway County Council, has completed improvement works to the wastewater network infrastructure at Ballyloughane, Co. Galway, and at Clifden, Co. Galway, where further operational improvements are underway. In addition, works are underway at Rush South and Loughshinny in Co. Dublin. Investigation is being undertaken by Irish Water, Dublin City Council, Dún Laoghaire-Rathdown County Council and the Acclimatize research project[18] to identify potential solutions for non-compliances at Merrion Strand and Sandymount Strand, within Dublin Bay.

Designated Shellfish Waters

For licensing purposes, the EPA requires Irish Water to provide an impact assessment of discharges on the microbiological quality of shellfish waters, where this is relevant to the discharge in question. This category includes 85 urban areas, and disinfection of the discharge may be necessary to protect from any adverse effects on the shellfish waters concerned. Impact assessment reports have been completed by Irish Water for all of these urban areas. It has been concluded that, in 8 of these cases, there are no impacts on shellfish waters. A further 32 are currently subject to further consultation, and the remaining 45 are undergoing more detailed assessment.

Designated Freshwater Pearl Mussel Sites

Only 1 of the 8 priority Freshwater Pearl-Mussel catchments (at Oughterard, County Galway) contains a waste-water treatment plant. The plant is being upgraded, and the works, which will be completed in 2018, will contribute to water-quality improvements in the receiving waters.

High-Status Waters

In relation to high-status water bodies, 8 waste-water treatment plants, discharging to 8 high-status water bodies, have either had major upgrades or will have upgrades completed by 2024. Of these, 7 will be completed by 2021 (see Table in Appendix 1).

7.2.2 Supporting Measures for Urban Waste-water

In addition to the high-level measures outlined above, a number of supporting measures aimed at addressing urban waste-water pollution are in place or are planned. These include:

- Improved operational and maintenance practices
- Targeted investment in sub-threshold waste-water treatment plants (WWTPs)
- Research and innovation in the management of urban waste-water

Improved Operational and Maintenance Practices

Capital investment in waste-water treatment and collection systems, together with optimal operation of these assets, is necessary to ensure compliance with the Urban Waste Water Treatment Directive and to meet environmental objectives. A key benefit of a single national water-services authority is the enhanced capacity of

18 https://www.acclimatize.eu/

such a single authority to deliver better knowledge sharing and implementation of best practice at national level. Over the period of this second cycle, Irish Water will continue to develop and implement standard operating procedures for the operation, maintenance and inspection of waste-water treatment plants and collection systems. Irish Water will also continue the development of asset registers and the refinement of treatment-plant capacities, which facilitate improved asset management.

Targeted Investment in Sub-Threshold WWTPs

It is recognised that, in some instances, the performance of smaller plants, which are subject to certificates of authorisation, can be the cause of significant pressures in water bodies that have been prioritised for action in this RBMP. Expenditure of €12 million, targeted at such plants, has been included in the current Irish Water Investment Plan (for 2017–2021). Detailed assessment of options for upgrade began in 2017 and will continue during 2018 and 2019.

Research and Innovation in Management of Urban Waste-Water

The CRU established the Water Services Innovation Fund to allow Irish Water to invest in innovative projects in order to explore novel technologies and operating arrangements designed to deliver benefits for customers. Proposed research projects must further a range of objectives, including achievement of relevant environmental standards and of WFD objectives. Irish Water is also currently involved in a number of research projects and programmes — including the EPA research programme, Science Foundation Ireland, Horizon 2020, INTERREG and Water JPI Research schemes — that will further support the long-term needs of Ireland's water and waste-water sector.

7.2.3 Urban Waste-Water and Urban Runoff — Principal Actions for the 2nd Cycle

The following sets out the principal actions to address pollution from urban waste-water and urban runoff over the period of the second cycle:

Principal Actions	
1	Over the period 2017–2021, Irish Water will invest approximately €1.7 billion in waste-water projects, programmes and asset maintenance. This investment will include €880 million for 255 major waste-water treatment projects, €350 million for capital investment in collection systems in 41 areas and €465 million for capital maintenance and national upgrade programmes.
2	Drainage Area Plans (DAPs) for waste-water collection systems will be completed for 44 urban areas by 2021, with the prioritisation of plans based on compliance with the Urban Waste Water Treatment Directive and the achievement of other environmental objectives.
3	Expenditure of €12 million, targeted at smaller plants causing significant pressures, has been included in the current Irish Water Investment Plan (for 2017–2021).
4	The EPA will continue to authorise and regulate waste-water discharges from urban areas.
5	The EPA will review urban waste-water discharge licences to reflect the improved evidence base that has gone into the preparation of this RBMP and to ensure that urban waste-water licences appropriately reflect the RBMP's objectives.
6	Irish Water will continue to develop and implement best operational practice across all of their assets. Among other things, this will entail developing and implementing standard operating practices for all waste-water treatment plants, developing a full asset register and completing a review of treatment-plant capacities.
7	Irish Water will commence development of its waste-water compliance strategy in 2018. Building on existing plans, projects and programmes, this will provide a long-term strategy for ensuring compliance with the requirements of the Urban Waste Water Treatment Directive and meeting the requirements of river basin management plans in a cost-effective manner.
8	There will be ongoing research and innovation in the areas of urban waste-water management, funded at both national and European levels.

7.3 Addressing Pressures from Forestry

As the Department with statutory responsibility for forestry, the DAFM recognises that inappropriately sited forests and poorly managed forest operations can negatively impact on water quality and on aquatic habitats and species, particularly in terms of sedimentation and nutrient runoff. As such, the protection of water forms a key component of the Department's assessment of all applications for forestry licences and grants. However, the DAFM and the wider forest sector also highlight the significant role that properly sited and managed woodlands and forests can play in protecting and enhancing water quality, through the delivery of a range of water-related ecosystem services.

The DAFM document *Forestry and Water: Achieving the Objectives and Priorities under Ireland's River Basin Management Plan 2018–2021* outlines the principal forestry-related legislative, policy, regulatory and promotional elements now in place to address the challenges and opportunities for forestry set out in the RBMP. The aims of these measures are to safeguard water during all forestry operations, to restructure existing forests to reflect water sensitivities, and to situate and design new forests in a way that contributes to the achievement of the Environmental Objectives set out in this Plan.

7.3.1 Programme of Measures to Address Pressures from Forestry

Forestry Regulation

As the national forest authority, the DAFM has numerous responsibilities in relation to forest activity in Ireland. These are principally based on the Forestry Act 2014 and Forestry Regulations 2017 (S.I. 191 of 2017), which provide for the regulation of afforestation, forest road works, tree felling and aerial fertilisation. Under the State-aided 2014–2020 Forestry Programme, the DAFM also promotes sustainable forest management through various support schemes for landowners, including the Afforestation Grant & Premium Scheme, the Woodland Improvement Scheme, the Forest Road Scheme and the Native Woodland Conservation Scheme.

In the years 2014–2015, 326 km of new forest roads were constructed and 12,449 ha. of new forests were planted on 1,981 sites under DAFM assessment procedures. The forests comprised 21% broadleaves and 79% conifers. As per the required standards, each site must include 10–15% open space and retained habitat (include water setbacks) and 10% broadleaves. 4,908 Felling Licences were issued, covering 32,929 ha. of thinning and 23,595 ha. of clear-fell[19].

As the consenting authority, the DAFM also has key responsibilities under the WFD and the Habitats Directives (as set out in transposing legislation), regarding its assessment of any application for the above activities. As part of its assessment process, the DAFM applies a variety of procedures to ensure that any licence/approval, if issued, is in keeping with the principles of sustainable forest management and the protection of the environment, including water. Elements of the process include referrals to various bodies, public consultation, screening in relation to Appropriate Assessment and Environmental Impact Assessment, inspections by Forestry Inspectors (undertaken via GIS, site visits and field visits), and the application of various DAFM requirements, protocols and scheme rules.

Land Types for Afforestation

The DAFM Land Types for Afforestation process (which commenced in March 2016) excludes a wide range of sites from the Afforestation Scheme on forest productivity grounds. These grounds include infertile conditions (as indicated by vegetation) as well as other limiting site factors. This exclusion overlaps with many habitats (including wet and dry heath and blanket and raised bog, which are all Annex I[20] habitats) and landscapes that are highly sensitive from a water perspective. This effectively excludes afforestation as a land use and as a potential pressure from these areas.

Environmental Requirements for Afforestation

The DAFM document *Environmental Requirements for Afforestation*[21], released in December 2016, stipulates mandatory measures for all afforestation, whether grant aided or not. These requirements consolidate and update previous environmental guidelines and contain various additional safeguards regarding the protection of water, including enhanced water setbacks; the inclusion of native woodland plots along watercourses; consolidated safeguards regarding such site inputs as drainage, cultivation, fertiliser application and herbicide use; the integration of S.I. 155 of 2012 regarding herbicide use; and the incorporation of a Potential Water Risk Scenario

19 The process whereby all of the trees in a specified area are felled
20 Annex I of the Habitats Directive lists 233 European natural habitat types, including 71 types in danger of disappearance
21 https://www.agriculture.gov.ie/media/migration/forestry/grantandpremiumschemes/2016/EnvironmentalRequirementsAfforestationDecember121216.pdf

Table and a template Water Management Plan, for use where particular concerns exist regarding water. The DAFM is currently preparing draft Environmental Requirements for Felling.

Felling and Reforestation Policy

The DAFM document *Felling & Reforestation Policy*[22] was published in May 2017 to tie in with the commencement of the Forestry Act 2014, under S.I. 191 of 2017. The document sets out the main statutory provisions regarding the licensing of felling activities. It also categorises reforestation in terms of "reforestation objectives", each with its own associated applications and prescription. Two of these reforestation objectives have a particular application in relation to the restructuring of existing forests within, for example, high-status objective water bodies, i.e. "Reforestation for Continuous Cover Forest" (CCF) and "Reforestation for Biodiversity and Water Protection" (BIO), to create semi-natural zones separating watercourses from more intensively managed areas. The document also sets out situations in which forest removal may be deemed acceptable by the DAFM, due to overriding environmental considerations relating to, *inter alia*, water and aquatic species.

Interagency Coordination

The recent DAFM document *Forestry and Water: Achieving the Objectives and Priorities under Ireland's River Basin Management Plan 2018–2021* outlines the proposed engagement between the DAFM and the key stakeholders involved in implementing the Plan. As part of inter-agency coordination around forestry issues, DAFM will participate in various forums and structures, including the National Technical Implementation Group, the Blue Dot Catchments Working Group for high-status waters and the Operations Committees of the regional local authority structures, the latter providing a key on-the-ground avenue of communication. Cross-training, peer-to-peer learning and ongoing interaction are also envisaged between the DAFM Forestry Inspectorate, officers of the Local Authority catchments assessment team, the LAWCO officers and the Agricultural Sustainability Advisers.

Coillte's Environmental Risk Assessment (ERA) Approach:

As the owner of over half of Ireland's forested lands, Coillte has a significant role to play in protecting water quality from potential impacts arising from its forest operations. In addition to the environmental controls applied by the DAFM, as outlined above, Coillte operates an Environmental Risk Assessment procedure to assess and manage potential environmental impacts associated with its forest operations. The ERA procedure identifies the sensitivity of sites to certain forestry activities and then specifies the planning actions and mitigation options that must be considered for various site types. The ERA procedure therefore integrates environmental risk assessment into each stage of the planning and operational process associated with tree felling.

Protocol for Handling Acute Forestry and Water Incidents

The DAFM document *Forestry and Water: Achieving the Objectives and Priorities under Ireland's River Basin Management Plan 2018–2021* sets out a protocol for addressing acute incidents where water bodies are impacted upon or are under risk from forestry activities. The protocol establishes a framework for inter-agency communication and reporting, and sets out how water professionals from stakeholder organisations can report an acute incident, the manner in which it will be investigated, and the follow-up actions that will be available to address the matter.

Forest and Water Research

The DAFM research programme for forestry is set out in the document *Forest Research Ireland — Meeting the needs of Ireland's forest sector to 2017 and beyond, through research and innovation*[23]. This programme allows significant scope for water-related research activity. Historically, the DAFM has also funded research projects studying the interaction between forests and water. Recent water-related research projects that are influencing forest policy and practices in relation to water include the following:

- Forestry Management for the Freshwater Pearl Mussel (FORMMAR)
- Combined Research on Riparian Woodland (CROW): A 4-year project (2010-2014) studying aquatic buffer zones (ABZs) in forests
- Assessment of the Impacts of Forest Operations on the Ecological Quality of Water (HYDROFOR): A 7-year (2008–2014) project jointly funded by the EPA and DAFM

22 https://www.agriculture.gov.ie/media/migration/forestry/treefelling/FellingReforestationPolicy240517.pdf
23 https://www.agriculture.gov.ie/media/migration/research/2016/ForestResearchIreland2014180116.pdf

Forestry Promotion

The Native Woodland Scheme package provides funding to undertake potentially significant works in relation to the delivery of water-related ecosystem services. It is implemented by the DAFM in partnership with Woodlands of Ireland, the National Parks & Wildlife Service, the Heritage Council, Inland Fisheries Ireland (IFI) and other native woodland stakeholders. It comprises two separate schemes:

- The Native Woodland Establishment Scheme (NWS Est.) funds the creation of new native woodland on open greenfield sites. This Scheme has the potential to deliver water-related ecosystem services, as set out in the recent DAFM document *Woodland for Water* (see below).
- The Native Woodland Conservation Scheme (NWS Cons.) funds the appropriate restoration of existing native woodland and the conversion from conifer forest to native woodland, primarily to promote native woodland biodiversity but also to deliver water-related ecosystem services. The Scheme criteria are also weighted towards water-sensitive sites.

Proposed Environmental Enhancement of Forests Scheme

The Forestry Programme 2014–2020[24] includes a funding measure entitled the Environmental Enhancement of Forests Scheme. Under this Scheme, a fixed grant will be available to forest owners to undertake particular actions and to achieve structural changes within existing forests and during current rotations. The Scheme's objective is to improve the environmental "footprint" of those forests regarding impacts on water quality, habitats and species, archaeological sites, landscape and other environmental sensitivities. The Scheme is currently in the development stage; once released, it will be of relevance to existing forests within water-sensitive areas.

Draft Plan for Forestry and Freshwater Pearl Mussel in Ireland

The DAFM is currently developing a Plan for Forestry and Freshwater Pearl Mussel (FPM) in Ireland, which will have direct relevance in relation to high-status-objective water bodies and protected areas.

The proposed Plan will apply to the 27 catchments (including the Priority 8 Catchments) of those rivers designated as SACs for Freshwater Pearl Mussel. It aims to ensure that all forestry activities licensed by DAFM are undertaken in a manner that does not threaten the achievement of the conservation objectives for the SACs involved, namely, "*To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.*"

This will be achieved through, *inter alia*, the application of a tailored Forest Management Framework to identify the level of risk associated with individual sites, and to match operations appropriate to that risk.

KerryLIFE

The DAFM is a co-beneficiary in the EU KerryLIFE project, led by the DCHG and involving DAFM, Coillte, Teagasc, the community-based South Kerry Development Partnership, and others. KerryLIFE is focused on sustainable land-use management for the conservation of Freshwater Pearl Mussel. KerryLIFE is trialling a wide range of approaches under both agriculture and forestry, and the outcome of the latter will have the potential for much wider application within the forestry sector. The project will run to December 2019.

Woodland for Water Measure

As set out in its document *Woodland for Water: Creating new native woodlands to protect and enhance Ireland's waters*, 2016, the DAFM proposes the strategic deployment of a measure combining an undisturbed water setback and new native woodland created under NWS Est., to form permanent semi-natural landscape features designed to deliver water-related ecosystem services. These include reduction in sediment mobilisation and runoff into watercourses, interception of nutrient runoff into watercourses, bank stabilisation, food input into the aquatic ecosystem, shading/cooling regulation of floodwater and mitigating acidification.

Funding is currently in place under NWS Est. to realise the Woodland for Water measure, and DAFM is keen to work with WFD partners to identify ways to strategically target it at key sites, particularly high-status-objective water bodies, and to encourage its uptake by farmers and other landowners.

24 https://www.agriculture.gov.ie/media/migration/forestry/forestryprogramme2014-2020/IRELANDForestryProgramme20142020230215.pdf

7.3.2 Mobilisation Measures

Specific mobilisation measures have been included in the DAFM's *Forestry and Water: Achieving the Objectives and Priorities under Ireland's River Basin Management Plan 2018–2021* document with the aim of focussing the application of the suite of measures outlined above to mitigate the impact of forestry activities on water and to maximise the protection and enhancement of water quality. These mobilisation measures include the following:

- Focusing on inter-agency coordination
- Developing training and peer-to-peer learning
- Targeting measures in Areas for Action
- Targeting individual forestry sites for the protection and enhancement of water
- Developing the aforementioned protocol for handling acute forestry and water incidents
- Improving water-related aspects of the assessment of forest licence applications

7.3.3 Principal Actions for the 2nd Cycle

The following sets out the principal forestry-related actions that are set out in the 2nd-cycle RBMP:

Principal Actions	
1	The DAFM will implement the forestry-related regulations, policies and requirements that are being realigned with national water policy.
2	Coillte, which owns over half of Ireland's forested lands, will continue to implement and refine its integrated Environmental Risk Assessment approach to its forestry operations.
3	The DAFM will promote the uptake of the National Woodland Establishment Scheme and the Native Woodland Conservation Scheme, and will finalise and launch the Environmental Enhancement of Forests Scheme.
4	With regard to the protection of Freshwater Pearl Mussel populations from forestry pressures, the DAFM will develop and implement the proposed Plan for Forestry & FMP in Ireland, and will continue its engagement with KerryLIFE, with a view to assessing and adopting appropriate measures for possible wider application.
5	Through the strengthened inter-agency co-operation structures, the DAFM will work with other stakeholders — with local authorities, in particular — to ensure the strategic deployment of forestry measures. Particular focus will be given to the protection of high-status-objective waters and to progressing the other priorities set out in this RBMP.
6	The DAFM and the EPA will continue to undertake forestry and water research to inform future forestry practices, so that they contribute to the protection and enhancement of water quality.

7.4 Addressing Pressures from the Harvesting of Peatlands

At present, large-scale peat-extractive industries are required to hold an Integrated Pollution Control (IPC) licence from the EPA for their activities. This relates to peat extraction from areas above 50 ha.. Bord Na Móna currently owns 6% of the peatlands of Ireland and is the largest peat extraction operator. It is also currently the only licensee. The licences issued for peat extraction activities, undertaken by Bord Na Móna, encompass an area of approximately 79,000ha. Active peat extraction currently occurs on approximately 20,000ha. of this land. Not all of the area included within the licensed-installation boundaries is an active peat-extraction area, however, since the area as a whole also includes buffer areas, silt ponds (Bord Na Móna manage more than 500 silt ponds), lands under rehabilitation and undisturbed peatlands. In addition to those granted to Bord Na Móna, the EPA currently has licence applications on hand from two other private commercial peat-extraction companies.

Peat extraction and associated drainage have been identified as a significant pressure in 119 (8%) of all water bodies that have been determined as being *At Risk* of not achieving their WFD objectives. Of these 119 water bodies, 115 are rivers, 3 are lakes and 1 is groundwater.

Of the 119 river water bodies that are *At Risk* because of activities taking place within peatlands, 46 (39%) of them are in areas that have peatlands owned by Bord na Móna, which has 87 peatlands in these areas. The remaining 73 water bodies are at risk from other activities, such as domestic turf extraction, unauthorised peat extraction, wind-farm construction, forestry or other commercial peat activities.

7.4.1 Programme of Measures to Address Pressures from Harvesting of Peatlands

Improvements to Legislative Controls

The DHPLG is currently progressing draft regulations that will put in place a streamlined licensing system for large-scale peat extraction to be regulated solely by the EPA. The new system will apply to peat extraction on any area exceeding 30ha., regardless of when the extraction commenced, and will operate seamlessly across local authority boundaries. As part of the implementation of EU Directives, Environmental Impact Assessment (EIA) will be mandatory in the consideration of licence applications. Appropriate Assessment (AA) will also be carried out, as necessary. On the introduction of the new system, peat extraction on any area exceeding 30ha. will become exempt from the requirement to obtain planning permission, thereby taking such peat extraction out of the planning regime.

When the new arrangements for large-scale peat extraction are in operation, it is intended to develop a separate regulatory regime that will bring smaller-scale commercial peat harvesting (on lands of less than 30ha. under a new local-authority licensing system incorporating EIA and AA, as appropriate, and enforcement powers. Proposals for this new authorisation system will be the subject of public consultation before legislation is drafted to underpin the new regulatory regime.

National Peatlands Strategy

A National Peatlands Strategy was published by the National Parks and Wildlife Service of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs in 2016. This Strategy aims to provide a long-term framework within which all of the peatlands within the State can be managed responsibly in order to optimise their social, environmental and economic contribution to the well-being of this and future generations. Public authorities responsible for sectors interacting with peatlands or that are charged with implementing cross-cutting objectives through their sectoral plans, policies and decisions, will be responsible for delivering the objectives of the strategy in their functional areas, in keeping with the strategy's vision, values and principles. In relation to water quality, the key principle established in the strategy is that "Policies and decisions relating to the use of peatlands shall take full consideration of potential impacts on water quality and the attainment by the State of mandatory water quality standards."

Under the Strategy, an examination of privately owned cutaway bogs will be undertaken to identify appropriate future uses, which will aim to harness their potential to contribute to environmental, economic and social wealth.

The Strategy expressly identifies peat harvesting as a pressure on water quality in certain areas and sets out high level actions to be undertaken by public authorities to ensure that any existing peat production does not have a detrimental impact on water quality, and to ensure that peatlands can contribute positively to achieving the objectives of the WFD.

These actions are:

- For all peatland related activities, it should be demonstrated that they do not, either individually or in-combination with other activities, adversely impact on the environmental objectives of the WFD, associated daughter Directives and national regulations.
- Peatland related activities should not significantly alter the environmental supporting conditions for Natura 2000 sites such that these cause a failure of the conservation objective for that designated habitat and by inference cause a risk of the WFD environmental objectives relating to protected areas not being met.

The implementation of these actions, and of all other actions set out in the strategy will be monitored by the Peatlands Strategy Implementation Group (PSIG). Various Government Departments and bodies have been assigned responsibility for the implementation of the actions including the DHPLG, the DCHG, the EPA and Bord na Móna. The PSIG will endeavour to ensure that the stated actions are undertaken and that the objectives of the strategy (and, by association, the WFD) are met. The group has prepared the first progress report on the implementation of the National Peatlands Strategy and, subject to the approval of the Government, this report will be published.

In addition to the National Peatlands Strategy, the National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017–2022 was published in December 2017. The plan sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan is intended to strike an appropriate balance between the need to conserve and restore Ireland's raised bog network and the needs of stakeholders, and it gives recognition to the important role that communities have to play in the conservation and restoration of raised bogs. Within the site specific restoration plans for the raised bog Special Areas of Conservation, drainage-management plans will be integrated to address some concerns regarding the potential for increased flooding in surrounding areas where restoration measures on raised bogs are being undertaken. These plans, including appropriate assessment where necessary, will be developed with input from stakeholders and the relevant public and national authorities.

Bord Na Móna's Sustainability 2030 Strategy and Biodiversity Action Plan 2016–2021

As mentioned above, in 46 (39%) of the 119 river water bodies that are at risk because of activities taking place within peatlands, the relevant areas contain Bord na Móna peatlands (87 in all) in which peat extraction and associated drainage works have been identified as a significant pressure.

Bord Na Móna has set out a Biodiversity Action Plan for the long-term rehabilitation of cutaway bogs, acknowledging obligations under the WFD and the Habitats and Birds Directive. The plan is built around the commitment from Bord Na Móna, within its Sustainability 2030 Strategy, to cease harvesting energy peat by 2030. Some key Bord Na Móna objectives under the Biodiversity Action Plan include:

- Trialling ammonia attenuation/retention opportunities in cutaway peatlands
- Developing a map of ecosystem goods and services for Bord Na Móna lands
- Adding to the raised-bog network under the Bord Na Móna
- Establishing a raised-bog Restoration programme
- Developing best practice guidelines relating to rehabilitation and restoration of a range of peatland types
- Controlling and monitoring invasive species

In addition, Bord Na Móna commenced work in early 2017 on preparing Environmental Impact Assessments on all of its peatlands including appropriate assessment, where necessary, in anticipation of the new streamlined licensing system for large-scale peat extraction (> 30ha) that will be operated by the EPA.

Bord Na Móna is committed to rehabilitating all of its peatlands once peat-production activities cease as required under condition 10 of its existing IPC licences, which were issued by the EPA to regulate industrial peat production. Rehabilitation generally comprises natural colonisation with or without targeted management. After-use involves the development of cutaway peatland for other land uses. Of the 79,000 ha. of peatlands owned by Bord Na Móna, approximately 15,600 had been rehabilitated by the end of 2017. Approximately 12,600 ha. constitute marginal land and have not been developed. Therefore, they do not require rehabilitation. The remaining 51,000 ha. remain to be rehabilitated. Of these,

approximately 9,000 ha. (covering 25 peatlands) are expected to be rehabilitated by 2021. This is subject to several assumptions, including the availability of cutaway bogs for rehabilitation. After-use projects may be developed for industrial development (e.g. renewable energy) on some of these sites in the future. Any consideration of future after-uses would be conducted following the relevant planning guidelines and in consultation with relevant authorities. Potential after-uses would also be considered within the framework of peatland rehabilitation, as required by the IPC Licences.

Of the additional 25 peatlands to be rehabilitated by 2021, 11 are associated with 12 water bodies *At Risk* of not achieving their WFD objectives. Of these water bodies, 11 are expected to achieve their objectives by 2027, a date that takes account of the time lag that is expected before the natural recovery of the ecosystems is complete. The remaining water body will not achieve its objective until after 2027.

Of the 119 water bodies where peat extraction and associated drainage works have been identified as a significant pressure, 6 are expected to meet their WFD objectives by 2021. (None of these is associated with Bord Na Móna peatlands.) A further 62 water bodies are expected to meet their WFD objectives by 2027. (Of these, 21 are associated with Bord Na Móna peatlands.) Another 51 water bodies are expected to meet their WFD objectives after 2027. (Of these, 25 are associated with Bord Na Móna peatlands.)

Recognising the impact that cutaway peatlands can have on water quality, the EPA has identified this priority issue as the subject of a research proposal for inclusion in its 2018 research call. The proposal involves evaluating mitigation strategies for improving water quality from drained peatlands. If selected, the project proposal is intended to integrate with the ongoing mitigation trials being undertaken by Bord Na Móna.

7.4.2 Peatlands — Principal Actions for the 2nd Cycle

The following sets out the principal actions to address impacts on water caused by peatland harvesting.

Principal Actions	
1	The Minister for Housing, Planning and Local Government intends to make regulations as soon as possible that will require the EPA to carry out EIA for all existing and new large-scale peat extraction (> 30ha) as part of its examination of IPC license applications for the activity. When these regulations are made, proposals will be developed for public consultation relating to a new regulatory regime that will bring smaller-scale commercial peat extraction (≤ 30ha) under a new local authority licensing system incorporating EIA and AA, as necessary, and enforcement powers.
2	The DCHG, together with the Peatlands Strategy Implementation Group, will oversee the implementation of the National Peatland Strategy and the first national management plan for Ireland's raised-bog Special Areas of Conservation (SACs) network. The principal aims of these are: ◢ To provide a long-term framework within which all of the peatlands in the State can be managed responsibly in order to optimise their social, environmental and economic contribution to the well-being of this and future generations ◢ In the case of the National Raised Bog Special Areas of Conservation Management Plan 2017–2022, to specifically set out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland
3	Bord Na Móna will implement its *Sustainability 2030 Strategy and Biodiversity Action Plan 2016–2021*, which addresses the long-term rehabilitation of its cutaway bogs.
4	By 2021, Bord Na Móna will rehabilitate an additional 25 peatlands covering approximately 9,000ha. This is subject to several assumptions, including the availability of cutaway bogs for rehabilitation.
5	The EPA has identified this priority issue as the subject of a research proposal for inclusion in its 2018 research call. The proposal involves evaluating mitigation strategies for improving water quality from drained peatlands. The project proposal, if selected, is intended to integrate with the ongoing mitigation trials being undertaken by Bord Na Móna.

7.5 Protecting Water Bodies from Invasive Alien Species

Zebra Mussels

Invasive alien species (IAS) emerged as an area of particular concern during the public consultation processes for development of this plan (see Section 2.3). While legislative responsibility for IAS rests with the DCHG, EPA monitoring and local knowledge from local authorities and IFI has confirmed the widespread presence of IAS nationally.

The potential impacts of IAS include the alteration of eco-systems (by causing bank erosion, for example), inhibition of access to water bodies, hindrance of land development and, in some cases, potential human health impacts. Ireland has experienced fewer issues with regard to IAS than other European countries; however, in line with increased globalisation, many of the most problematic aquatic IAS were introduced within the last 20 years.

Experience has confirmed that it is technically infeasible to remove most IAS once they become established. Our first priority will therefore be to prevent the introduction of potential high-impact IAS. Our second priority will be to eradicate or effectively control IAS at the early stages, before they become firmly established.

Consequently, core tasks for dealing with IAS will include measures to address monitoring, surveillance, early-warning protocols, rapid response, control and bio-security. The National Parks and Wildlife Service (NPWS) provides funding to enable the National Biodiversity Data Centre to provide a service for the collation and dissemination of surveillance information, including early warnings on the risks and/or discovery of IAS.

There will be a critical role to play in IAS data gathering and management for the new Local Authority Water Support and Advisory Teams[25]. Their presence within the catchments of water bodies where IAS are a significant pressure will help in the identification and quantification of localised problems. Investigative Assessment guidance developed by the EPA includes the identification of aquatic IAS among the principal components of the assessment methodology and the investigative assessment reports will serve as key datasets in building a national picture of the presence of IAS.

25 These teams, established under the operational structure of the RBMP, are responsible for the catchment-based investigative assessments.

7.5.1 Programme of Measures to Address Aquatic and Riparian Invasive Alien Species with High Impact on Surface Waters

Implementation of EU Regulation (1143/2014) on "the prevention and management of the introduction and spread of invasive alien species"

EU Regulation (No. 1143/2014) on "the prevention and management of the introduction and spread of invasive alien species" requires EU-wide action to prevent, minimise or mitigate their adverse impacts. Currently, 49 species are listed under the Regulation, of which 9 occur in Ireland, and these require particular attention. Additions to this list may be made in the coming years as our knowledge base improves.

The DCHG has overall responsibility for implementation of the Regulation although many actors — including the public — will be required to ensure effective implementation.

Development of the DCHG's Management Plans for the management of priority species[26] during this RBMP cycle will be key to providing information on pathways, pathway mitigation, practical control and eradication or containment (if eradication is technically infeasible). Priority will be given to high-impact IAS that are at an early stage in the invasion process, species of which eradication or significant control is possible.

Development and implementation of clear governance arrangements and coordination mechanisms across relevant public bodies

The DCHG is working with a number of stakeholders to put in place strong governance arrangements for the management of IAS. This will involve the assignment by Government of responsibility for managing aquatic IAS in Ireland. During this RBMP cycle, a coherent and co-ordinated national approach to IAS management will be developed, an approach that will facilitate communication and collaboration between relevant authorities, including Government Departments, IFI, the NPWS, the Office of Public Works (OPW), the EPA, local authorities, the Sea Fisheries Protection Authority and the Marine Institute. Authorities in Northern Ireland, NGOs, other stakeholders and the public will also be included in this approach.

A Teagasc Invasive Alien Species Agriculture Working Group was established in 2017. The purpose of the group is to create awareness and provide information to the agriculture industry. The Group brings together expertise from Teagasc, the National Biodiversity Data Centre, government departments, the Irish Farmers' Association (IFA), Coillte and industry stakeholders.

One of the first actions of the group was to initiate the development of GLAS-training-course material on IAS. This material is to be presented at GLAS Courses for 50,000 farmers in 2017/18.

Harnessing community and stakeholder involvement and support to ensure the long-term sustainability of IAS projects

IAS is a cross-cutting issue that requires the participation of a wide range of community groups and stakeholders to be effective. Bottom-up community catchment initiatives, therefore, have significant potential for local action to address IAS. Community engagement will be essential to achieving success.

Such bodies as IFI, the NBDC, and the NPWS are beginning to work with communities and stakeholder groups, especially through LAWCO, to help build capacity and skills for IAS control and management. The availability of trained and committed community and stakeholder groups can provide valuable resources (e.g. citizen science, volunteers, IAS champions in clubs) to supplement public bodies' efforts in the areas of IAS monitoring, surveillance, early-warning systems, rapid response, control and bio-security.

In addition, IAS has been selected as a topic for inclusion in the GLAS training programme with a view to increasing both advisor and farmer awareness and knowledge of the threats posed by invasive species. Information notes on selected species are now available on the DAFM's website[27].

Development and promotion of national guidelines for bio-security to prevent the introduction and spread of IAS, and to mitigate their impacts

When strengthened governance arrangements for the management of IAS are in place, assistance will be provided to relevant public bodies that work with watercourse or water management and maintenance. These bodies will be assisted in the development and implementation of bio-security protocols to prevent the spread of IAS. These protocols will be prepared initially for the staff of the relevant public bodies, but their use will also be promoted more widely among other water users.

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26 Listed in EU regulation 1143/2014

27 http://www.agriculture.gov.ie/farmerschemespayments/glas/glastraining/

EPA funded research on IAS

To date, the EPA has commissioned 11 research projects on IAS[28]. The Agency is currently funding two research projects on IAS prevention, control and eradication. The first is led by Sligo Institute of Technology and will employ surveys and experiments to inform and improve biosecurity at potential IAS points of entry into Ireland, and also to reduce secondary spread within the island. The second project is led by UCD and will produce sustainable and cost-effective guidelines for the control of invasive plants. The EPA will continue to prioritise further research on IAS in future water-research calls. The outcomes of these research projects will be used to improve national biosecurity protocols and to develop our understanding of IAS in advance of the third RBMP in 2021.

7.5.2 Invasive Alien Species — Principal Actions for the 2nd Cycle

The following sets out the principal actions to address aquatic and riparian IAS that have a high impact on surface waters:

Principal Actions	
1	EU Regulation (1143/2014) on "the prevention and management of the introduction and spread of invasive alien species" will be implemented, with overall responsibility resting with the DCHG, with many other actors required to ensure implementation.
2	Clear governance arrangements for managing aquatic IAS in Ireland, including the assignment of responsibilities and development of agreed co-ordination mechanisms, will be put in place. This work will continue to be led by the DCHG and will seek to promote cross-border co-operation on the issue.
3	The DCHG will also lead on the development of management plans for priority IAS, with priority given to high-impact IAS where eradication or control is possible.
4	National guidelines for bio-security will be developed to prevent the introduction and spread of IAS and to mitigate their impacts.
5	Supported by LAWCO, the relevant State bodies — the DCHG, the NPWS and IFI, in particular — will work to harness community and stakeholder involvement and support to ensure the long-term management and control of IAS.
6	Through future research calls, the EPA will continue to fund research on IAS, including those impacting on the water environment. The outcomes of current EPA research projects will influence the development of control measures for the next-cycle RBMP in 2021.

28 http://erc.epa.ie/smartsimple/

7.6 Measures to Protect and Improve the Physical Condition of the Water Environment

There is increasing evidence that the physical condition (hydromorphology) of surface waters is as important to maintaining healthy ecosystems as the quality of the water sustaining them[29]. In particular, abnormally high siltation levels are a cause for concern. In addition, physical barriers in rivers, such as impassable weirs, can impede the movement of water and sediment, and can also prevent the migration of certain protected fish species, consequently affecting the health of their populations. The catchment characterisation process found hydromorphology to be a significant pressure in approximately 24% of water bodies identified as *At Risk*. Of the submissions from the RBMP consultation processes, 29 raised issues relating in some way or other to hydromorphology. While there has been a substantial improvement in international engagement on the development of a collective understanding of the ecological impacts of hydromorphological alterations to surface waters, much work remains to be completed across Europe, particularly in the context of integrating hydromorphology more fully into the formal ecological status classification.

The DHPLG has identified that the ultimate goal is to have a statutory control regime in place to manage activities impacting on the physical condition of the water environment — as well as a prioritised programme of restoration for impacted waters — by the time the third RBMP is published in December 2021. The Department envisages that the control regime will be risk-based and proportionate, consisting of a tiered approach that includes general binding rules, registration and licensing. In preparation for this, between 2018 and 2021, substantial technical work is planned by the EPA and IFI, with the support of other authorities, to further develop systems for the assessment of hydromorphological condition and its relationship with ecology. The planned work programmes are summarised below. In parallel, by 2019, technical guidance will be prepared on best-available environmental practices for the mitigation of physical-development impacts on water ecological status. This will be a sub-element of guidance being prepared that will advise planning authorities on taking RBMP objectives into account during the physical planning process (see Section 7.9.1).

7.6.1 Programme of Measures for Improving the Physical Condition of the Water Environment

Amended environment and planning regulations introduced since 2010

The 2011 Environmental Impact Assessment (EIA) (Agriculture) regulations (S.I. 456 of 2011) require an EIA screening and consent process for farmers with regard to three activities: (1) restructuring of rural land holdings (2) commencing use of uncultivated land or semi-natural areas for intensive agriculture and (3) land drainage works on lands used for agriculture. Where it is intended to undertake any of these activities, and the proposed works a) exceed certain threshold values or b) are to be carried out within (or may affect) a proposed NHA or a nature reserve or c) may have a significant effect on the environment, an application must be made to the DAFM. The assessment process considers whether the proposed works are likely to have a significant effect on the environment. Where risks are identified, works are not permitted without DAFM consent. These regulations provide additional protection of waters from damaging physical alterations.

The 2011 Planning and Development (Amendment) Regulations (S.I. 454) provided for the exempted development threshold for drainage of wetlands to be reduced from 20 ha. to 0.1 ha.. It also provided for the threshold for mandatory EIA for such drainage to be reduced to 2 ha..

Improvements in Assessment Methods and in Knowledge of the Physical Condition of Surface Waters

The experience of WFD implementation, both across the EU and within Ireland, shows that there is a need to improve how hydromorphology is taken into account, specifically in relation to ecological-status assessment, monitoring and characterisation, as well as in the design and implementation of measures[30]. This is to be expected since this aspect of ecosystem quality has only recently been the subject of assessment, and methods are still evolving.

There are multiple potential benefits to be gained from adopting a more comprehensive approach that measures the physical condition of surface waters directly at a larger scale. Benefits include

29 EU FP7 Project REFORM (REstoring rivers FOR effective catchment Management: http://reformrivers.eu/reform-results)

30 Terms of Reference for Ad-hoc Task Group on Hydromorphology (Draft dated February 2016). Common Implementation Strategy for the Water Framework Directive and the Floods Directive - Work Programme 2016-2018

a more comprehensive and objective means of measuring departures from natural conditions, thereby facilitating the establishment of criteria for the regulation of future development that involves modifications to surface waters. This approach will also provide the basis for design criteria to be applied in future habitat-restoration projects. An additional benefit will be the provision of a more robust and objective basis for supporting decisions on whether a water body is so significantly modified that it should be considered for designation as a Heavily Modified Water Body (HMWB). Currently there are 35 HMWBs nationally. Once the more comprehensive approach to measuring the physical condition of surface waters is developed, a review of HMWBs will be carried out by the EPA. An improved assessment of hydromorphology will also inform the assessment by the OPW of flood-mitigation options, thereby supporting Flood Risk Management Plans.

There is increasing evidence that the impairment of the physical integrity of rivers, lakes and transitional waters can impact negatively on their ecosystems and hence on their ecological status. A key focus during this 2nd cycle will be to build the evidence base that will enable us to determine how significant physical conditions are in supporting good and/or high ecological status in surface waters. With the support of other agencies, the EPA will work to develop the necessary evidence base.

To maintain and, where necessary, restore physical conditions of surface water to support good and/or high ecological status, environmental standards will need to be developed. With support from other state agencies, the EPA will work during this 2nd cycle to improve our understanding of the hydromorphology of surface water bodies and to develop the requisite environmental standards.

Separately, IFI has identified the need to improve the assessment of barriers along rivers (e.g. weirs and dams) that may be impacting on a range of migratory fish species, including species protected under the Birds and Habitats Directive. IFI will lead a multi-stakeholder programme that will collect and collate data to support the development of this inventory of barriers nationally. These will be ranked according to the risk they pose to fish migration. The inventory will form the basis of a prioritised restoration programme to be implemented in cycle 3. This work will also contribute to a large-scale EU project called AMBER and to a broader understanding of the ecological impact of barriers.[31]

Both the EPA and IFI have developed technical work programmes for the period 2017–2021 to improve assessment methods and knowledge of the physical condition of surface waters. These are set out in Tables 7.2 and 7.3 below. The work programmes will be managed through working groups overseen by the new RBMP governance and coordination structures.

Steps	2017		2018		2019		2020		2021
1. Improve knowledge of hydromorphology–ecology relationships	■	■	■	■	■	■	■	■	■
2. Develop assessment tools		■	■	■					
3. Assess hydromorphological condition		■	■	■	■	■			
4. Review heavily modified designations					■	■	■		
5. Develop key indicators and agree a monitoring programme					■	■	■	■	
6. Identify appropriate measures						■	■	■	■
7. Develop and agree a prioritised restoration programme				■					■
8. Develop environmental quality standards					■	■	■	■	■
9. Adapt tools for assessing impacts of proposed developments					■	■	■	■	■

Table 7.2 - High level timeline for the EPA national hydromorphology work programme (rivers, lakes and coastal waters)

31 The AMBER project (Adaptive Management of Barriers in European Rivers) is a multi-disciplinary research project involving 20 partners from 11 countries including Ireland, funded from the European Union's Horizon 2020 Research and Innovation Programme.

Steps	2017		2018		2019		2020		2021
1. Initial set-up phase		■							
2. Development of a barrier-assessment tool consistent with current EU best practice		■	■	■	■				
3. Comprehensive programme of barrier-survey and risk assessment in line with available resources		■	■	■	■	■	■	■	■
4. Database storage of a national inventory of barriers for the purpose of interrogation and prioritising barriers for mitigation			■	■	■	■	■	■	■
5. Prioritisation of structures for mitigation and a schedule of proposed works to be undertaken during the 3rd-cycle RBMP					■	■	■	■	■
6. Production of guidance documents regarding structural mitigation options and permissions/surveys required for barrier mitigation					■	■	■		■

Table 7.3 - High level timeline for the IFI barriers to migration work programme

Mitigation measures incorporated in the Office of Public Works' drainage maintenance programme

Under the 1945 Arterial Drainage Act, the OPW is obliged to carry out maintenance work on the network of arterially-drained channels. Since 1990, the OPW has worked with IFI and its predecessors to develop maintenance strategies that would reduce adverse habitat impact and that could provide habitat benefit[32]. This has resulted in the compilation of a series of Environmental Management Protocols and Standard Operating Procedures[33]. Annually, the OPW undertakes maintenance on approximately 2,000 km of channels in its network, following the environmental drainage maintenance procedures to minimise environmental impact. The guidance provides potential for significant retention of riparian habitat and also for alteration of instream hydromorphology in appropriate locations.[34] The latter is achieved through diggings that can alter the uniform cross-section and/or longitudinal profile of the channel. This is a zero-cost option as the requisite machinery will be on site. The reduced floodplain connectivity in arterially drained channels leads to reduced overall River Hydromorphological Assessment Technique (River-HAT)[35] scores for the area examined. However, the channel may achieve Good and High scores for some of the other 8 attributes scored in River-HAT assessments.

The OPW's environmental guidance facilitates the achievement of Good and High scores for several of the hydromorphology attributes assessed.

Over the second cycle, the OPW will continue to carry out maintenance on 2,000 km of channels each year. Robust implementation of the environmental procedures has the potential both to minimise adverse environmental impacts and to effect positive hydromorphological change in drained channels. In 2008, the OPW, with IFI, initiated a new programme called the Environmental River Enhancement Programme (EREP), and this is currently operational. The EREP focus is on achieving hydromorphological improvement through two main strands — implementation of specific river-enhancement works, such as importing spawning gravels, and implementation of environmental methods in channel maintenance, such as alteration of the channel bed to form more natural riffle pool glide sequences. This Programme will continue during the 2nd cycle.

32 King, J. J., O' Grady, M. F. and Curtin, J. (2000) The Experimental Drainage Maintenance (EDM) programme: engineering and fisheries management interactions in drained Irish salmonid channels. Verh.Internat.Verein.Limnol. 27, 1532-1535.
33 http://www.opw.ie/media/OPW%20Environmental%20Management%20Protocols%20&%20SOPs%20April%202011.pdf
34 King, J.J., Lehane, B.M., Wightman, G.D., Dooley, R. and Gilligan, N. (2011) Development and implementation of environmental protocols in river maintenance in Ireland. *Water and Environment Journal*, 25, 422 - 428.
35 http://www.epa.ie/wfdstatus/rivers/RW_RHAT_training_guide_final_20_04_09.pdf

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Improving fish passage in the Shannon catchment

Section 7.6.1 outlined a programme currently being led by IFI to develop an inventory of barriers on rivers nationally. These will be ranked according to the risk they pose to fish migration and the achievement of WFD and Habitats Directive objectives. The inventory will form the basis of a prioritised restoration programme to be implemented in cycle 3.

In relation to the Shannon catchment, it is known that fish migration, both upstream and downstream, is impacted by the presence of several man-made structures on the Shannon, including the Parteen Dam. Impacted species include salmon, eels, sea trout, twaite shad, allis shad and sea lamprey. While man-made structures can impact negatively on fish stocks, other issues — including marine survival rates, water pollution and climate change — also play a part. To determine the optimum solution at Parteen and to consider the impact of barriers to fish migration more generally in the Shannon catchment, the Minister for Housing, Planning and Local Government will establish a Steering Group to review and make recommendations for improving fish passage throughout the catchment. In determining the optimum solution, the Steering Group will have regard to the broader socio-economic, environmental and stakeholder requirements in the Shannon Catchments, and to Ireland's obligations under EU directives. The Steering Group will consist of representatives of IFI, the Marine Institute, Waterways Ireland, the OPW, the NPWS, the Electricity Supply Board (ESB) and Irish Water. The Group will be chaired by the DPHLG and will make its recommendations within 18 months of being established. As part of the overall solution to problems affecting fish migration, the Group will make recommendations with regard to the most appropriate funding mechanism for a Shannon fish-migration improvement programme. It is also envisaged that a monitoring and evaluation plan will be put in place to assess the effectiveness of the programme. In addition, arrangements will be put in place to engage with local stakeholder groups that have an interest in fisheries management. The engagement process will keep these groups informed of progress while also seeking their views on the solutions being considered by the Steering Group.

Supporting research projects

Several research projects have been initiated by the EPA in response to the requirement to address the physical condition of surface waters. These include the SILTFLUX project[36] (finished in 2017), which aimed to develop a better understanding of fine sediment flux in Ireland and the ecological impacts of siltation. The COSAINT project[37] aims to assess the environmental, ecological and socio-economic impact of existing and potential measures that prevent cattle access to watercourses. The project finishes in 2018.

36 SILTFLUX: http://77.74.50.157/siltflux/
37 COSAINT: https://www.dkit.ie/centre-freshwater-environmental-studies/research-projects/lake-catchment-management/cosaint-project

The DETECT project[38] aims to disentangle the effects of multiple environmental stressors acting on rivers and lakes, including the physical deterioration of habitats and will be completed by 2020. The RECONNECT project[39], which runs until 2019, aims to develop a methodology for identifying barriers and for prioritising barriers for modification or removal. The project is looking at the socio-economic impact of weir removal/modification and brings together all of the findings to produce a validated multi-criteria decision-support methodology to inform decisions in relation to choice of obstacle(s) for removal or modification. The project also assesses the ecological and hydromorphological impact of the most common structures in Ireland, mainly weirs. Outputs from this project will support IFI's aforementioned programme to create a national catalogue of barriers to fish migration.

7.6.2 Protecting and Improving the Physical Condition of the Water Environment — Principal Actions for the 2nd Cycle

The following sets out the RBMP's principal actions related to hydromorphology:[38] [39]

Principal Actions	
1	Existing regulations, which (1) provide for EIA to mitigate the impact of planned land-use changes on waters and (2) reduced the exempted-development threshold for drainage of wetlands from 20 ha. to 0.1 ha., will continue to contribute to protecting surface waters from deterioration.
2	The EPA will improve assessment methods and knowledge of the physical condition of surface waters through a number of actions, including the development of a Morphological-Quality Index for Irish rivers and enhanced use of GIS for assessing lakes, transitional waters and coastal waters.
3	The EPA, with the support of other agencies, will develop the necessary evidence base for establishing the link between physical integrity of water bodies and ecological status. The EPA will also define appropriate environmental supporting conditions with regard to hydromorphology.
4	IFI will lead a multi-stakeholder programme that will collect and collate data to support the development of an inventory of barriers to fish migration nationally.
5	Mitigation measures incorporated in the OPW drainage maintenance programme will be applied for all such works.
6	The Minister for Housing, Planning and Local Government will establish a Steering Group to review and make recommendations on improving fish passage throughout the Shannon catchment within the period of this Plan.
7	A series of 4 EPA research projects related to hydromorphology (SILTFLUX, COSAINT, DETECT and RECONNECT) will be completed, and their outputs will be used to inform future actions to mitigate the impact of hydromorphological impacts.

38 DETECT: https://www.afbini.gov.uk/articles/detect-project
39 RECONNECT: http://www.ucd.ie/reconnect/

7.7 Addressing Abstraction Pressures

The WFD requires regulation of abstractions of surface water or groundwater that are likely to have a significant effect on water status. The DHPLG is currently reviewing the regulatory framework for water abstractions (see Section 7.7.2 below). New proposals will be brought forward and made subject to public consultation in 2018. It is envisaged that the control regime will focus on the most significant abstractions, recognising that the Directive does not require controls over abstractions that do not have a significant impact on the status of water bodies. The new control regime will address all abstractions from surface waters and groundwater, including reservoirs. It is important to note in this context that only 254 (6%) water bodies (rivers, lakes and groundwater) nationally have had abstraction pressures identified by the EPA as potentially posing a risk to their environmental objectives. The EPA is currently reviewing the risks to these water bodies from abstraction pressures. It is likely that the actual level of impact will be lower than 6%.

7.7.1 River Basin District Characterisation and Abstraction Risk Assessment

For the purpose of this RBMP, the EPA has undertaken a quantitative assessment of abstraction amounts and compared them to estimated natural flow for rivers, water levels for lakes and groundwater levels for groundwater bodies. The abstraction volumes used for the assessment are based on best-available information about known abstractions. This information is taken from an abstractions dataset recently collated by the EPA. The dataset covers some 2,507 abstractions, of which 1,190 are public drinking-water supplies, 608 are privately sourced group water supplies or small schemes and some 709 are associated with industrial installations, bottled water plants, power generation plants, quarries, mines, schools and private supplies. Some 1,120 of the abstractions in the overall dataset are greater than 100 m^3/day. Of these, 85 are associated with licensed industrial facilities.

The assessment shows that the level of risk due to abstraction pressures in Ireland is low. Nationally, out of a total of some 3,192 river and 812 lake water bodies, 137 river (4%) and 76 lake (9%) water bodies were identified for further review to determine if abstractions are posing a risk to the environmental objectives of those water bodies. Out of a total of 513 groundwater bodies, 41 (8%) were identified for further review to determine if groundwater abstractions are posing a risk to the environmental objectives of those surface water bodies. A more detailed, case-by-case assessment will now be undertaken to confirm if these 254 water bodies are in fact failing to meet their objectives under the WFD due to impacts from abstraction pressures. This assessment will be undertaken during the course of the river basin planning cycle up to 2021. Where necessary, the required corrective measures will be identified, and steps will be taken to address such pressures where they arise.

7.7.2 Programme of Measures to Address Abstraction Pressures

Regulatory Framework for Water Abstractions

Legislation under Preparation

In December 2017, the Government approved the commencement of work on a General Scheme of a Water Environment (Abstractions) Bill which it is intended to publish in summer 2018 and to have enacted by the end of 2018. The Bill relates to the development of an appropriate regulatory framework for all abstractions greater than 25 m^3/day.

While Government proposes to publish legislation by summer 2018, this will be preceded by an extensive public consultation process. There has already been some initial engagement with key stakeholder groupings. Formal consultation on the regulatory framework and proposed legislation will commence in Quarter 2, 2018.

It is envisaged that there will be a single regulatory framework for all water abstractions. The new regime will address abstractions from both surface waters and groundwater.

Subject to the outcome of public consultation, the existing 1942 and 1964 Acts governing the abstraction of water by water-services authorities will be repealed, and a new stand-alone piece of primary legislation governing the regulation of water abstractions will be established. The proposed approach to regulation will be risk based (see Table 7.4 below). Abstractions considered as posing a low risk to the environment will be addressed solely by way of registration and general binding rules. Higher-tier activities will require authorisation; this may involve either a "simple" licence or a "complex" licence, depending on the size of the abstraction and the risk presented to the water environment.

The approach adopted should be consistent with the principles of better regulation and ensuring proportionality, consistency, minimising the cost to the operator and the taxpayer, and minimising the administrative burden without compromising in terms of effective environmental protection.

Level of Authorisation	Abstraction Size Threshold
General binding rules apply only	< 25 m^3/day
Registration and general binding rules apply	25–250 m^3/day
Simple licence required where a water body is *At Risk* from abstraction (Registration also necessary)	251–1,000 m^3/day[40]
Complex licence applies (Registration also necessary.)	> 1,000 m^3/day

Table 7.4 - Indicative regulatory hierarchy for water abstractions and the related size thresholds (thresholds subject to public consultation)

To provide some context for the thresholds proposed, 25 m^3 per day equates to the total daily water usage for approximately 100 households. It is expected that almost all public water supplies managed by Irish Water will require licensing if they are abstracting from *At Risk* water bodies, because they will exceed the 250m^3/day threshold. For group water schemes, it is estimated that more than half of current group water schemes that abstract their own water will exceed the 25 m^3/day threshold and will have to register. However, it is anticipated that few group schemes will reach the licensing threshold. It is estimated that farmers with 200 dairy cows or more will exceed the 25 m^3/day registration threshold and will be required to register. No farmers are expected to exceed the 250 m^3/day threshold.

Licence applications will be assessed against environmental criteria to ensure compliance with WFD objectives, individually and cumulatively. The EPA proposes to use a computerised natural flow model to assess the impact of abstractions on natural flows for licensing purposes. A register of abstractions will first be established to assist the EPA in carrying out assessments of the cumulative impacts from abstractions.

Existing abstractions greater than 250 m^3/day will be reviewed to examine any potential risk to WFD objectives. Where necessary, programmes of measures will be implemented as part of the next RBMP cycle to address identified risks. New abstractions above 250 m^3/day, and those requiring EIA or AA, will be permitted subject to compliance with WFD requirements.

No charging for water abstraction is envisaged. In the case of larger-scale abstractors, however, it is likely that a licensing fee will apply to cover the administrative costs of the licensing system.

Register of Water Abstractions

In Quarter 2, 2018, the Minister for Housing, Planning and Local Government will make regulations that will establish a comprehensive national register of water abstractions, which will be constantly updated. This register will be an on-line self-registration system. The system has been developed by the EPA on the CRM software platform. All abstractions above 25 m^3/day will be required to register their details with the EPA by a prescribed date.

Guidance has been prepared that will provide advice to the water abstractor on how to estimate abstraction volumes based on the type and size of activity giving rise to the abstraction.

Work carried out by the Department of Housing Planning and Local Government estimates that between 2,500 and 3,000 abstractions will exceed the registration threshold of 25m^3/day and will require registration (See Figure 7.2).

40 A complex licence may apply in the case of abstractions in this size range, depending on the level of risk to the water environment. The risk will be determined in the course of screening for environmental assessment and for appropriate assessment as required by the EIA Directive and the Habitats Directive.

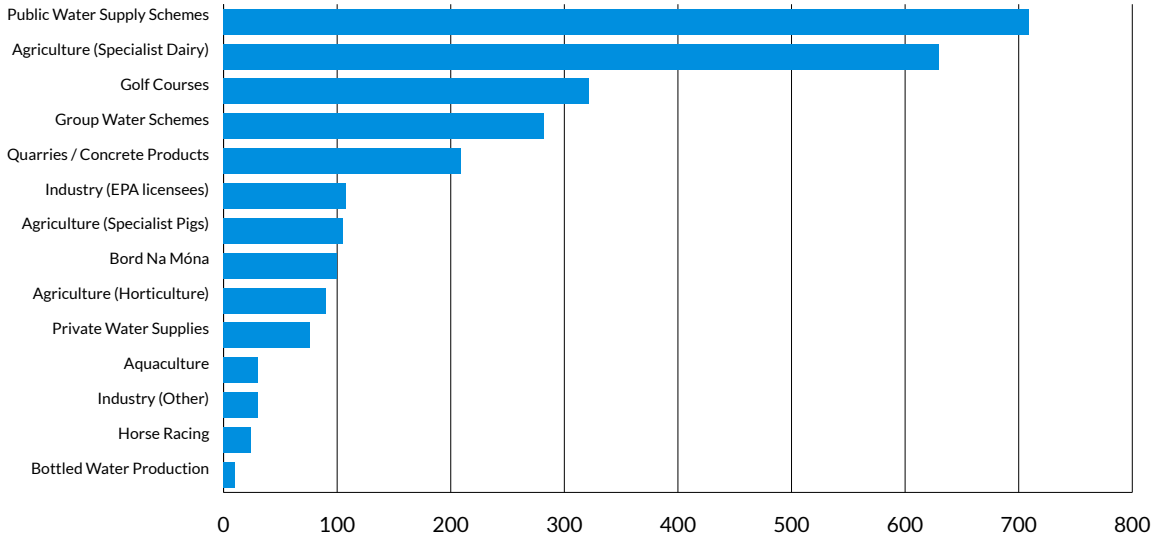


Figure 7.2 - Estimated number of abstractions above 25m^3 per day by industry/sector

In keeping with the principles of the Aarhus Convention regarding access to information, public participation and access to justice, data on the register will be held and made available to the public.

National Water Resources Plan

Irish Water has statutory responsibility to ensure the proper and effective management of water resources nationally, and to ensure that all customers have access to a safe and secure drinking-water supply. Public water-supply schemes currently serve 83% of the population. Irish Water operates 790 water-treatment plants, abstracting from some 1,173 abstraction points, divided approximately into 70% groundwater and 30% surface water. In terms of volume, approximately 80% of public drinking water comes from surface water sources, with approximately 20% coming from groundwater.

In order to ensure the delivery of a safe and secure drinking-water supply, Irish Water is developing the National Water Resources Plan (NWRP). The NWRP will outline how Irish Water will move towards a sustainable, secure and reliable drinking-water supply over a 25-year timeframe, while safeguarding the environment and considering the potential impacts of climate change on water resources. The draft NWRP will be published for public consultation during 2018.

In developing the NWRP, Irish Water is undertaking the following actions:

- Assessment of the availability of water resources at a national level (including lakes, rivers and groundwater)
- Assessment of the current and future water demand from homes, businesses, farms, and industry
- Identification of areas where there are current and future potential water-supply shortfalls, taking into account normal and extreme weather conditions
- Identification, development and assessment of options to help meet potential shortfalls in water supplies
- Consideration of the impacts of climate change on Ireland's water resources
- Development of a Drought Plan recommending measures to be taken before and during drought events

These actions feed into the creation of supply–demand balance forecasts for public water supplies. This forecasting involves the calculation of sustainable yields, i.e. the volume of water available for use at each abstraction point taking, account of the requirement to maintain healthy ecological flow conditions, so as to be consistent with the achievement of WFD environmental objectives. A common understanding of ecological flow conditions has been established in European Guidance (CIS Guidance Note No. 31 — Ecological

flows in the implementation of the WFD), and this will be developed in Ireland through the proposed National Regulatory Framework for Abstractions. The sustainable yield calculated for each abstraction is balanced against projected demands on water supplies over the next 25 years.

In preparing the NWRP, Irish Water will need to take account of the new regulatory framework for water abstractions described above.

Improvements in the National Hydrometric Monitoring Programme

Reliable flow and/or level estimates are required for individual water bodies in order to determine the cumulative impact of abstractions on water bodies. To provide for this, the EPA has responsibility for the National Hydrometric Monitoring Programme under Section 64 of the EPA Act (1992).

In 2017 the EPA finalised its review of the National Hydrometric Programme with respect to future needs. The review addressed the definition of the national network, the responsibilities of other hydrometric data providers and the maintenance requirements for sites in the network that are the responsibility of the EPA and local authorities. The EPA has also upgraded its modelling capability to facilitate more detailed water balance assessments in order to support future water-resource management decisions.

In response to the EPA review, several local authorities commenced the upgrade of a number of hydrometric stations to ensure that they are fit for purpose. Maintenance programmes for monitoring stations may have to be updated by a number of local authorities in response to the EPA review.

7.7.3 Addressing Water Abstraction Pressures — Principal Actions for the 2nd Cycle

The following sets out the principal actions aimed at addressing abstraction pressures for the 2nd cycle:

Principal Actions	
1	The EPA will undertake further assessment of the 6% of water bodies identified for further review to determine if abstractions are posing a risk to these water bodies' environmental objectives under the WFD. The EPA will advise on appropriate measures to mitigate the pressures identified.
2	The Minister for Housing, Planning and Local Government will make regulations in Quarter 2, 2018 to establish a comprehensive and maintained register for water abstractions greater than 25 m^3/day.
3	The DPHLG will consult on an appropriate regulatory framework for abstractions greater than 25 m^3/day per day with a view to progressing the primary legislation to the Houses of the Oireachtas for consideration later in 2018.
4	Following public consultation, Irish Water will publish Ireland's first National Water Resource Plan by the end of 2018.

7.8 Overview of Measures to address other pressures

The previous sub-sections set out the programme of measures aimed at addressing the most important significant pressures within the river basin district. This subsection sets out the proposed measures to address other pressures, namely, land use and planning, flood risk, climate change, lead in drinking water and hazardous chemicals.

7.8.1 Water and Land-Use Planning

The RBMP recognises the need for alignment and integration with the planning system in order to ensure effective water management and compatibility between planned growth and environmental sustainability.

Planning in Ireland is critically important to the well-being of our water bodies. We require both plan-making at a strategic level and careful consideration of individual applications for planning permission. The planning system, therefore, makes a significant contribution to water objectives by ensuring that development that could pose a risk is avoided in the first instance, where feasible, and by including appropriate planning conditions in planning permissions for new development.

Within the planning hierarchy, there are a number of national, regional and local plans that can impact on water management and water quality. These establish the spatial context for sustainable development and growth, while also setting out approaches and measures to reduce and mitigate their environmental impacts.

At the apex of the planning hierarchy is the National Planning Framework (NPF) — the Government's successor to the National Spatial Strategy (Figure 7.2). Below the NPF will be three Regional Spatial and Economic Strategies (RSESs) with which, in turn, county and city development plans must be consistent.

Public consultation on the draft NPF was completed in 2017 and was subject to Strategic Environmental Assessment (SEA). The NPF was published in early 2018. The three RSESs, which are also subject to SEA, will be subject to public consultation.

The aim of these planning policy documents is to put in place long-term national, regional and local development frameworks within which all parties (government departments and agencies, the three regional assemblies and local authorities, as well as wider private-sector and community interests) will work together to ensure proper planning and sustainable development. These frameworks will deliver optimal planned and sustainable development across the country as a whole: nationally, regionally and at local level.

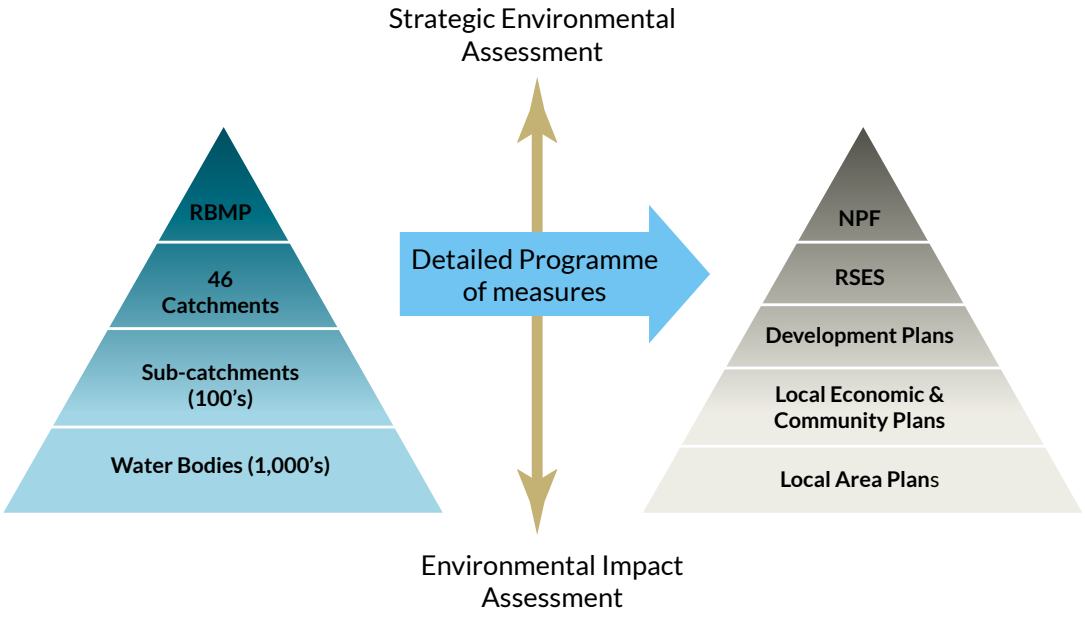


Figure 7.3 - Hierarchical structure of RBMPs and planning policy

Key policy instruments to ensure that plans, policies and projects are better aligned are Strategic Environmental Assessment (SEA), at a strategic plan- and programme-making level, and Environmental Impact Assessment (EIA), at the project level, including planning applications for developments of strategic importance under the Planning and Development (Strategic Infrastructure) Act 2006.

SEA assessments are undertaken before plans or programmes are adopted, so that the impact of the proposed plans and their objectives on the environment, including water bodies, can be evaluated and used to inform strategic-growth options and to ensure that the built environment responds to the sensitivities and requirements of the wider natural environment. The NPF, RSESs and County and City Development Plans are all subject to mandatory SEA, and consideration of impacts of the proposed plans on water quality and on the RBMP is one of the key elements of the SEA process.

At the detailed stage of development management, EIA will include consideration of potential impacts and risks to water objectives as considered within planning policy documents, all of which have undergone SEA, with due consideration of the RBMP. Any necessary avoidance and mitigation measures will be attached.

Guidance for Planning Authorities

Effective integration between river basin management and land-use planning is crucial to ensure that development is compatible with the objectives set in our RBMPs. Of the submissions arising out of the RBMP consultation process, 23 cited land-use planning issues that required addressing during cycle 2. The need for guidance for planning authorities was central to many of the issues highlighted.

The WFD 2000/60/EC is given general effect in planning legislation as specified in Section 1(A) of the Planning and Development Act 2000, as amended. 2010 planning legislation has also improved how water management and the planning system are integrated by requiring development plans to support the protection and enhancement of water quality, particularly with regard to securing the objectives of the RBMPs. The legislation also required that the location of development should be linked to existing waste-water treatment capacity and planned investment in capacity in the future. However, enhanced clarity is needed with respect to the practical steps, approaches and methodologies to be employed by the relevant authorities to give effect to these requirements.

At present, limited guidance is available for planners on how to take account of risks to RBMP objectives when making decisions regarding planning and development management. To address this issue, the DHPLG has scoped out a project to develop detailed guidance to assist planners in their role, and also to assist developers and other stakeholders in making appropriate applications for planning permission. The DHPLG has policy responsibility for both river basin planning and spatial planning. External expert-consultancy support will be required to assist in the preparation of the guidance and in the completion of the project. Consultancy services are currently being procured and will be in place in Quarter 2, 2018. It is expected that the guidance will be published in 2019. Training for planning authorities in the application of the guidance will also be necessary.

It is envisaged that the proposed guidance will provide a methodology for planning authorities to ensure that relevant development plans and planning decisions are consistent with RBMPs and the requirements of the WFD. The preparation of this guidance will include input from the County and City Management Association, the DAFM, the EPA, IFI, Irish Water, the NPWS, the OPW and others, as required.

In preparing the guidance, consideration will also be given to relevant recent developments at EU level, including guidance recently published by the EU Commission concerning derogations from the provisions of the WFD under Article 4(7) of the Directive. CJEU cases, such as case C-461/13 — the "Weser Case" — will also be taken into account. In this regard, it is acknowledged that new legislative processes may be required to facilitate the possibility of applying "derogations" from the WFD in accordance with Article 4(7), where justified.

The guidance document will aim to:

- Establish clear and easy-to-implement methodologies for considering RBMP objectives throughout the physical planning process, from the development plan-making stage through to the project implementation stage
- Ensure that mitigation measures to avoid deterioration in ecological status are built into the design stage of infrastructural

projects that are within or close to surface waters. In this regard, the guidance will be particularly important in contributing to the protection of high-status waters from potential deterioration arising from future development. (see Section 8.3.2 on the *"Blue Dots Catchment Programme"*)

- Avoid or mitigate the adverse effects of inappropriate development on RBMP objective
- Avoid unnecessary restrictions on sustainable growth/development
- Confirm that EU directives and domestic legislation are complied with (having regard, for example, to recent guidance from the Commission on WFD Article 4(7) processes relating to exemptions from the default environmental objectives established within the Directive)
- Ensure a standardised nationwide approach for different Planning Authorities
- Generally improve the understanding of the RBMP process and objectives among planning authorities and developers

Furthermore, supplementary, supporting, technical guidance on best-available environmental practices for the mitigation of physical development impacts on water ecological status will be prepared.

It is intended that the technical guidance underpinning this planning-and-water guidance will be periodically updated and expanded as best-available knowledge and practices are improved (see below).

Section 7.6 of this Plan outlines work currently underway in Ireland to improve hydromorphological assessment methods for rivers, lakes, estuaries and coastal waters led by the EPA and IFI. It also commits to developing the ecological evidence base to derive physical supporting conditions necessary to support good and high ecological status (GES and HES, respectively). These areas will be a significant focus during the next RBMP cycle up to 2021. From a forward planning perspective, this will deliver significant benefits. By deriving supporting physical conditions for GES and HES this will in turn facilitate the design of improved mitigation measures aimed at protecting against deterioration in ecological status. Technical guidance on mitigation measures will be reviewed and revised, where appropriate, once physical conditions supporting for GES and HES are more clearly defined. In the meantime the delivered guidance will reflect the best available knowledge and practices in mitigating the ecological impacts of physical development in and near surface waters.

7.8.2 Assessment and Management of Flood Risks

The OPW is the competent authority in Ireland for the EU "Floods" Directive. The OPW has been implementing the Directive through the national catchment-based Flood Risk Assessment and Management (CFRAM) Programme. This has included the preparation of 29 Flood Risk Management Plans (FRMPs) for the country, which have been subject to SEA and plan-level AA and were prepared in coordination with the implementation of the WFD, as set out in the FRMPs. The FRMPs were published in early 2018, following approval by the Minister for Finance and Public Expenditure and Reform.

An assessment of the most appropriate measures to reduce or manage the flood risk within each catchment has been undertaken, focusing on 300 communities that are subject to flood risks that have been identified in the Areas for Further Action (AFAs) as potentially significant. One aspect of the assessment looked at the potential impact of possible measures on water bodies achieving WFD objectives. This assessment has determined at a high level which measures might cause impacts in terms of the objectives of the WFD, varying in scale and duration. As part of its consideration of viable alternatives for managing flood risk for the community, the assessment has also considered the overall impacts and benefits to people and society, the environment, our cultural heritage and the economy across all objectives.

Assessing the Potential Impact of Flood-Protection Projects on WFD Objectives

Following approval of the FRMPs, the next stage in progressing the proposed flood risk-management measures will be to undertake more detailed assessment and design at a project level, before submitting the proposals for planning permission or exhibition under the Arterial Drainage Acts. These assessments will typically include an EIA and, where necessary, a project-level AA in line with the Birds and Habitats Directives. The assessments will provide a detailed appraisal of the potential impacts of the proposed measures on water-body hydromorphology and status and, where necessary, a detailed appraisal under Article 4(7) of the WFD (derogation related to deterioration caused by new modifications). This will build on the initial work done during the preparation of the FRMPs. The work planned by

the EPA to improve assessment methods for river morphology (see Section 7.6 on physical condition) has the potential to assist in (1) assessing the potential impact of flood-management measures on WFD objectives, (2) identifying the most appropriate mitigation measures and (3) supporting decisions on the application of Article 4(7) derogations. The EPA and the OPW will work together to develop technical methods to assist in the assessment of impacts from flood-protection measures.

The Potential Role of Natural Water Retention Measures (NWRMs) as Part of the Suite of RBMP Mitigation Measures for Cycle 2

A number of submissions to the RBMP consultation strongly supported the use of Natural Water Retention Measures (NWRMs) as part of the RBMP programme of measures, recognising the potential for multiple benefits. In December 2017, the Water Policy Advisory Committee requested the National Technical Implementation Group (NTIG) to develop a proposal for including NWRMs as part of a broader suite of mitigation measures that could contribute to the achievement of environmental objectives set out in the second RBMP.

Natural Water Retention Measures (NWRMs) could potentially be used as mitigation measures to address water-quality problems as part of the second RBMP programmes of measures. They could be used in a similar manner to the measures described in the Targeted Agricultural Modernisation Schemes (TAMS) and the DAFM Native Woodlands Schemes, providing multiple benefits in relation to water quality, biodiversity, climate-change adaptation, fisheries, landscape-amenity objectives and flood attenuation.

NWRMs work by storing or attenuating water in the environment, allowing it to be released slowly, either as runoff to rivers and streams or by soakage to the water-table. By slowing or reducing runoff, flood flows downstream can be reduced. This is typically achieved by changing land-use practices in the catchment, so that soils have a greater capacity to store water. These land-use changes can include the rehabilitation of wetlands and the construction of new storage, such as retention ponds. In-channel works and restoring river meanders can also be used to slow the flow.

The EPA intends to fund further research on NWRM by prioritising a research project in the 2018 Water Research Call. The project proposal was developed in collaboration with the OPW. The purposes of the project are:

- To explore new measures
- To consider how existing measures can be adapted to achieve multiple benefits in an Irish setting. The UK Environment Agency's "Working with Natural Processes" Framework and the European Commission's NWRM project are examples of such measures

Measures in Flood Risk Management Plans signpost the need for the OPW to work with the EPA, local authorities and other agencies to identify, where possible, measures that will have benefits for both WFD and flood risk management objectives. This collaboration will take place during the project-level assessments of physical works and, more broadly, at a catchment level. The measures, which include NWRMs, could have significant synergies across a number of areas, including biodiversity and potentially other objectives, including the use of pilot studies and applications, where possible.

7.8.3 Climate-Change Adaptation

The Intergovernmental Panel on Climate Change (IPCC) states that warming of the climate system is unequivocal, and that it is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century[41]. The resulting impacts can be observed on natural and human systems on all continents and across the oceans, with evidence of climate-change impacts most evident in natural systems[42].

Climate change will have diverse and wide-ranging impacts on many aspects of our environment, including ecosystems, water resources, agriculture and coastal zones. Observations show that Ireland is experiencing more weather extremes, along with rises in sea level, increases in average temperature and changes in precipitation patterns.

Nationally, the scale and rate of change is consistent with regional and global observations and trends. These changes are predicted to continue and increase over the coming decades, bringing the following challenges in respect of water supply[43]:

- Significant reductions are expected in average levels of annual, spring and summer rainfall.

41 IPCC Fifth Assessment Report, 2013
42 IPCC Climate Change 2014 Synthesis Report
43 Ireland's National Adaptation Framework, P.33

The more frequent occurrence of dry spells will result in increased pressure on water supply.

- The number of very intense storms is projected to increase, with ensuing risks to water infrastructure.
- Sea level rises and temperature increases[44] will create an increased risk to coastal aquifers and water supply.

There is considerable public interest in addressing the impact of climate change on waters. The theme was raised as a Significant Water Management Issue in the DHPLG's SWMI consultation, which was undertaken in 2016, and again in the Department's consultation on the draft RBMP, with 14 submissions setting out people's concerns on the effects of climate change on water. (Both consultation processes are referenced in Section 2.4).

A robust, flexible and long-term process of climate-change-adaptation planning in Ireland is required, notwithstanding the mitigation outcomes that are achieved.

The National Adaptation Framework

The Government approved Ireland's first statutory National Adaptation Framework (NAF), developed under the Climate Action and Low Carbon Development Act 2015 (the Climate Act)[45] on 19 December 2017. The NAF, which will be reviewed every five years, specifies the national strategy for the application of adaptation measures in different sectors and by local authorities in their administrative areas in order to reduce the vulnerability of the State to the negative effects of climate change and to avail of any positive effects that may occur. The NAF does not identify specific locations or propose adaptation measures or projects in individual sectors. Respecting the principle of subsidiarity, detailed adaptation measures will be developed within and across sectors, including the local government sector, in accordance with the policies laid out in the NAF.

The NAF will require the Minister for Housing, Planning and Local Government to prepare a specific sectoral adaptation plan in relation to water quality and water-services infrastructure under the thematic area of water-resource and flood-risk management. Section 6 of the Climate Act requires that the Government, within three months of publication of the NAF, will request the relevant Ministers to prepare sectoral adaptation plans, specifying the timeframe for their submission. As such, the DHPLG will receive this request before May 2018, together with the required timeframe for submission. The Department is committed to drafting a comprehensive, whole-of-sector plan within the timeframe specified. The sectoral plan will be a crucial step in identifying the key climate vulnerabilities of the water sector in Ireland. It will also identify adaptation options that will help to build climate resilience and adaptive capacity within the water sector. The plan will be an important first step in ensuring that climate change is eventually fully mainstreamed into water policy in Ireland, including via river basin management planning.

National adaptation policy in Ireland is co-ordinated through a national-adaptation steering committee, chaired by the Department of Communications, Climate Action and Environment (DCCAE), The committee includes membership from the relevant sectors in addition to others, such as the Department of Public Expenditure and Reform, the EPA and the local-government sector. The water sector is represented on the sectoral committee by the DHPLG and by Irish Water.

Climate-adaptation policy in Ireland, including policy for the water sector, will evolve over time in response to ongoing assessments of impacts and vulnerabilities. Adaptation planning is a continuous process, in which plans and actions can be modified and changed as new information and research becomes available. Given the cross-sectoral relevance of water management, it will also be important that sectoral plans prepared in other sectors align with the goals of this RBMP. To ensure policy coherence and to identify any potential for synergies and co-benefits, it will be important that other sectors are engaged on climate issues as early as possible.

44 Sea levels are projected to rise by up to 0.8m, with a warming of 1.9°C by the end of the century
45 https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/National-Adaptation-Framework0118-4235.aspx

7.8.4 National Lead Strategy for Drinking Water

Lead is a naturally occurring metal that is found in rocks, soil, water and air. Since the 1970s, there has been a growing concern with risk to health from exposure to lead. While a number of sources of lead in the environment have been removed (through such measures as the banning of lead paint and the introduction of unleaded petrol), lead plumbing and pipes remain a potential source of exposure. In recent years, measures have been taken in order to address this risk.

The legal limit for lead in drinking water was lowered in December 2013 from 25 micrograms per litre to 10 micrograms per litre (also expressed as parts per billion).

The Government published a National Strategy to Reduce Lead in Drinking Water[46] on 9th June 2015. In response to the recommendations of this strategy, Irish Water, following a period of public consultation, published the Lead in Drinking Water Mitigation Plan[47] on 10th May 2017. This plan identifies measures to mitigate the risks to human health posed by the presence of lead in drinking water.

Based on current available data, Irish Water estimates that lead pipework exists in approximately 180,000 residential properties in Ireland as well as in many commercial and public buildings. The Strategy recognises that the most effective long-term strategy is to remove all lead supply pipes both on the public network (where removal would be undertaken by Irish Water) and within private properties (where removal would be undertaken by property owners). To this end, Irish Water is embarking on a 10-year programme to replace all known public lead-supply pipes and is engaging with the DHPLG on a Behavioural Change Study to look at potential incentives and measures to increase the rate of replacement within private properties by property owners.

As it will take many years to achieve this target, Irish Water proposes, as an interim mitigation measure, to review up to 400 water treatment plants with respect to the possible introduction of corrective water treatment. Following this review, it is likely that approximately 140 water treatment plants will be selected for the introduction of corrective water treatment, which will include orthophosphate treatment and pH adjustment, over the short to medium term. These measures will reduce the ability of lead to dissolve into water running through pipes.

In order to minimise the potential for impact on the environment from phosphorus loss, Irish Water will target areas that have a demonstrated risk of exposure to lead. Where it is technically, economically and environmentally viable to do so, Irish Water will implement corrective treatment. It is planned to roll out this programme over three years, subject to site-specific environmental assessments.

Phosphorus has the potential to impact on the environment, and in particular on water bodies, through the process of nutrient enrichment and eutrophication. Therefore, it will be necessary to consider the risk of environmental impact, the pathways by which the added phosphorus may reach environmental receptors and possible mitigation measures to offset any such impact.

Site-specific environmental assessments are being carried out in each water-supply zone. Where a significant risk to environment receptors associated with orthophosphate treatment is identified, the necessary environmental protection measures will be implemented.

7.8.5 Hazardous Chemicals in the Aquatic Environment

As stated previously, apart from two ubiquitous substances (mercury and PAHs), the level of non-compliance with the Environmental Quality Standards for Priority Substances and Priority Hazardous Substances is very low in Ireland and is not a significant concern. For the most part, exceedances arise due to the presence of naturally-occurring metals in known mineral-rich areas, particularly where mining has been carried out.

During routine monitoring, a number of pesticides — including Mecoprop, MCPA and 2,4-D — have been detected at low concentrations in a large number of rivers. MCPA was the most widely observed substance (detected in 63% of all rivers surveyed), followed by Mecoprop (detected in 44% of rivers surveyed) and 2,4-D (detected in 28% of rivers surveyed). The significance of the pesticide levels detected is being assessed, especially in the context of drinking-water protection. Exceedances of the drinking-water

46 http://www.housing.gov.ie/water/water-quality/lead-drinking-water/national-strategy-reduce-lead-drinking-water-published

47 https://www.water.ie/docs/Lead-in-Drinking-Water-Mitigation-Plan.pdf

standard arise principally due to the presence of MCPA, which was detected in 3% of public water supplies monitored in 2016.

Changes to EU water legislation have taken place since the commencement of the first cycle River Basin Management Plans. Directive 2013/39/EU has revised the environmental quality standards for a number of priority substances, added new substances to the original list and included additional environmental quality standards for biological quality elements. The revised Priority Substances Directive also provides for the establishment of a Watch List to monitor concentrations of emerging pollutants and other substances of concern in the aquatic environment. The EPA has commenced monitoring for the Watch List substances. Results for 2016 and 2017 indicate that while some of the substances were detected in Irish waters, they are not considered to be present at significant concentrations.

Ireland currently expends significant resources in monitoring and assessing the presence and concentration in the aquatic environment of chemical substances of concern. Monitoring is undertaken by a variety of state agencies and departments with a range of statutory responsibilities relating to water quality.

Separately, member states are responsible for identifying other chemical substances that are not listed in Directive 2013/39/EU but which could be present in the aquatic environment at levels that pose a risk to the environment. These are called "specific pollutants", and member states are required to develop environmental quality standards for them and to manage them accordingly.

Strategic Approach to Monitoring and Managing Hazardous Chemicals in the Aquatic Environment

While the level of known hazardous substances in Ireland to date is generally low, there is a recognised need to take a more strategic and forward-looking approach to their management — particularly as new pollutants emerge in the aquatic environment. Across a range of state bodies, there is considerable technical expertise in the area of hazardous substances that could be better utilised through improved coordination. In the RBMP consultation, 27 submissions identified hazardous chemicals in water as an issue that needs to be better managed through the river basin planning process.

In response to these concerns, the EPA established a National Aquatic Environmental Chemistry Group (NAECG) in January 2018 to establish and maintain national expertise on hazardous chemicals in the aquatic environment, and to bring a more strategic and forward-looking approach to the management of hazardous chemicals. The Group brings together experts in the monitoring, assessment and management of hazardous chemicals from many of the national agencies whose remits depend on having an understanding of the source, fate (including monitoring) and impact of chemicals in the water environment. The Group is chaired by the EPA and includes participants from such organisations as the DHPLG, the Marine Institute, Irish Water, the Health and Safety Authority, the DAFM, the Geological Survey of Ireland, local authorities and the DCCAE.

The NAECG is a collaborative initiative that will be used to make recommendations regarding the review and monitoring of chemical substances of concern. The risks associated with such substances will be assessed from an environmental and human-health perspective, and advice on the future management of these substances will be given. Through the sharing of expertise and knowledge, the NAECG will:

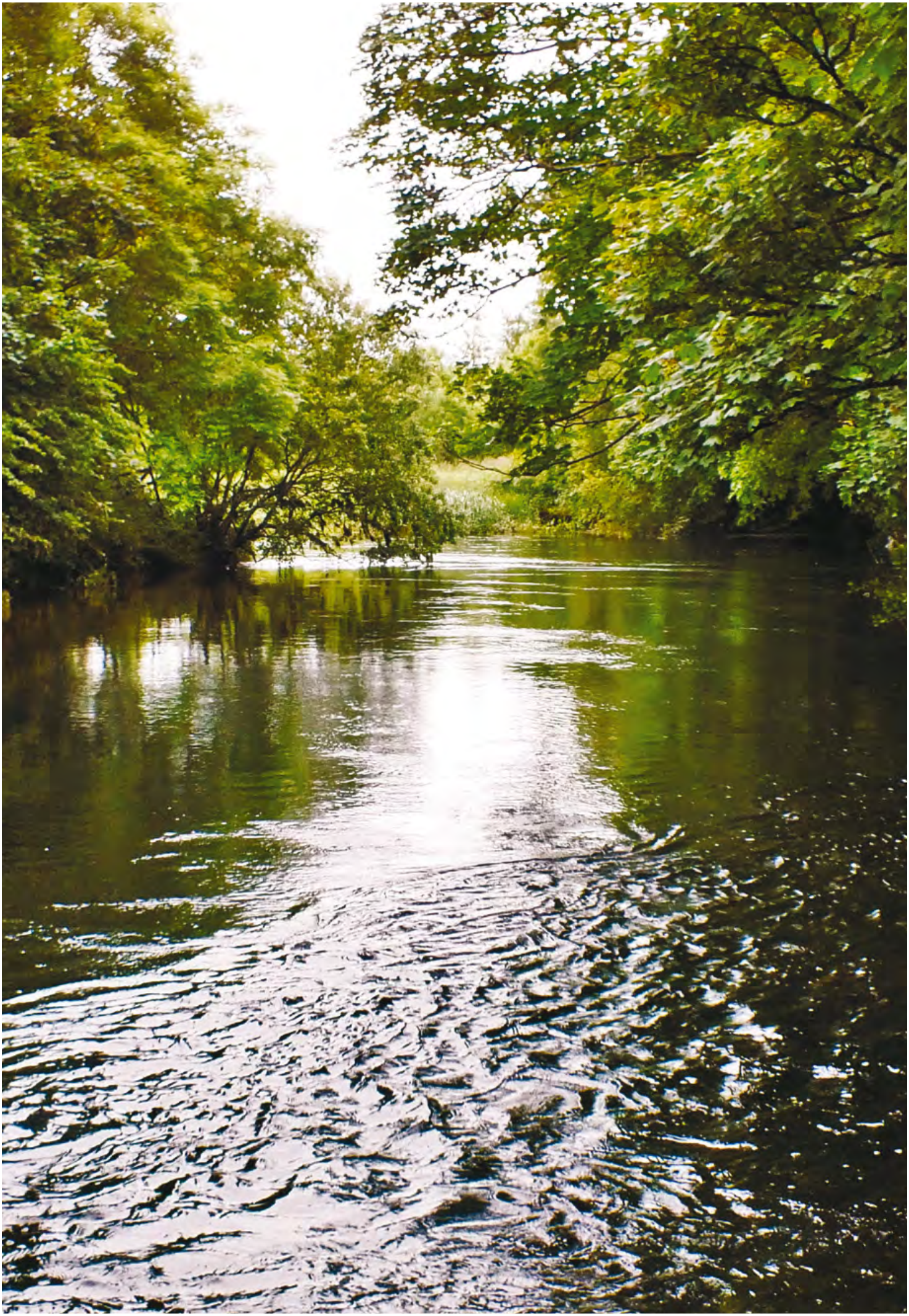
- Act as a forum for the identification of issues relating to the presence of chemical substances in Ireland's aquatic environment
- Assess the risks posed by chemical substances in the aquatic environment from an environmental and human-health perspective
- Facilitate and encourage the sharing of information, expertise and data
- Facilitate the development and maintenance of technical skill sets as required
- Recommend approaches to the setting of environmental quality standards for specific pollutants in Ireland, and to the development of this capability into the future
- Inform monitoring programmes for priority substances, priority hazardous substances, watch-list substances and specific pollutants
- Provide advice to the national Water Policy Advisory Committee with regard to the future management of chemical substances posing a risk to the aquatic environment and human health

The NAECG will meet at least twice per year to progress the actions outlined above and will be overseen directly by the National Technical Implementation Group.

7.8.6 Measures to address other pressures — Principal Actions for the 2nd Cycle

The following sets out the principal actions for the second cycle with regard to addressing other pressures:

Principal Actions	
1	The DHPLG will prepare high-level guidance for Planning Authorities on the relationship between physical planning and river basin management planning. This guidance will provide a methodology for Planning Authorities to ensure that relevant plans and planning decisions are consistent with river basin management plans and with the requirements of the WFD.
2	The OPW will undertake project-level assessment of all relevant, proposed physical flood-management measures before submitting plans for exhibition, including, where necessary, a detailed appraisal under Article 4 of the WFD. The NTIG will develop a proposal for including NWRMs as part of a broader suite of mitigation measures that could contribute to the achievement of environmental objectives set out in the second RBMP.
3	The DHPLG will work to ensure that relevant actions relating to the water environment are addressed in the National Climate Change Adaptation Framework.
4	Site-specific environmental assessments will be carried out on any water supply zones where orthophosphate treatment is proposed as part of the National Lead Strategy for Drinking Water.
5	In January 2018, the EPA established a National Aquatic Environmental Chemistry Group (NAECG) to establish and maintain national expertise on hazardous chemicals in the aquatic environment, and to adopt a more strategic and forward-looking approach to the management of hazardous chemicals.



Section 8: Measures for Protected Areas & High-Status Waters

As outlined in Sections 4 and 5, significant progress remains to be made with regard to meeting the requirements for our protected areas. This section sets out the planned programme of measures for Drinking Water Protected Areas (DWPAs), Special Areas of Conservation (SACs) with water dependency and high-status waters.

8.1 Achieving the Requirements for Drinking Water Protected Areas

The Water Framework Directive (WFD) requires the identification of DWPAs. These are reservoirs, lakes, rivers and the groundwater bodies from which water is abstracted to provide water for people to drink. Where necessary, this raw water is treated to purify it to the required drinking-water standard. The risks need to be identified in order to protect water from contamination by substances which, when it occurs, makes more treatment necessary. Where risks are identified and it is found that a particular land use may be causing pollution of the raw water, Safeguard Zones may be delineated. Actions can be targeted in these zones to address pollution, so that additional treatment of raw water can be avoided.

8.1.1 Public Water Supplies

Irish Water currently operates 790 water-treatment plants that abstract from some 1,173 abstraction points, divided approximately into 70% groundwater and 30% surface water. In terms of volume, approximately 80% of public drinking water comes from surface water sources with approximately 20% coming from groundwater. These public water-supply schemes serve 83% of the population. High-level risk assessment has already been applied as part of the 2017–2021 investment planning process to help develop a national picture of investment needs. Irish Water plans to prepare a full Drinking Water Safety Plan (DWSP) for each water supply, but this will take a number of investment cycles to complete. A DWSP identifies all potential risks to the water supply, from catchment to consumer, and sets out the mitigation measures and procedures that need to be put in place to manage these risks. Each DWSP will look at 6 elements: source protection, raw water, treatment, distribution, customer and management.

Public Drinking-Water Source Protection

Pending the completion of full DWSPs, Irish Water is working on a programme to complete a Source Risk Assessment for each drinking-water supply. The purpose of these risk assessments is to identify drinking-water sources that may require measures to protect the catchment of the drinking-water source, thereby avoiding the need for additional purification treatment in the future. Table 8.1 sets out Irish Water's planned programme for the completion of 353 Source Risk Assessments by the end of 2021, with the remainder to be carried out in the next investment cycle.

Year	Planned Progress	Number Completed
2016	Source Risk Assessments, completed as part of full DWSPs, already carried out for major capital projects	55
2018	Source Risk Assessments, to be completed as part of a review of existing source-protection plans and zones of contribution, developed previously by the EPA, LA and GSI	148
2018	Source Risk Assessments to be completed as part of preparation of a National Water Resources Plan	100
2021	10 Source Risk Assessments *per annum* to be completed from 2017–2021	50
Total		**353**

Table 8.1 - Irish Water programme for preparation of DWSP Source Risk Assessments

A collaborative approach is being taken to effectively manage and protect *At-Risk* drinking-water sources from activities within the catchment area. This approach will be built on co-operation between Irish Water, the Environmental Protection Agency (EPA), local authorities, the Department of Housing, Planning and Local Government (DHPLG), Teagasc and the Department of Agriculture, Food and the Marine's (DAFM) 's pesticides divisions.

As the national water services authority that is ultimately responsible for providing and developing public water services, Irish Water will co-ordinate the initiative. Irish Water is also responsible for ensuring that drinking water is safe and secure and meets the standards in the Drinking Water Regulations.

However, Irish Water does not by itself have the necessary authority, the full range of expertise or the capacity necessary to assess the risks and to implement drinking-water source protection. To deliver these measures at local level, Irish water will collaborate with the EPA, local authorities, the DAFM's pesticides divisions, Teagasc and the Geological Survey of Ireland (GSI).

The EPA is responsible for enforcing the Drinking Water Regulations. Irish Water will work with the EPA to ensure that the highest-risk sources are correctly prioritised for action. Irish Water will work closely with the GSI, the EPA and other relevant authorities to agree an approach to delineating and mapping drinking-water protected areas, safeguard zones —and to managing the risk within these areas appropriately.

Local authorities have the lead role in integrated catchment management in the river basin planning process. A priority for the second RBMP is the achievement of objectives related to protected areas, including DWPAs. Local authorities have undertaken the prioritisation of Areas for Action at regional level through the Regional Management Committees (see Section 10) and the Regional Operational Committees. Within these Areas for Action, mitigation and protection measures will be identified and implemented to achieve the environmental objectives established in the RBMP.

Where pesticides are a concern, the DAFM is responsible for implementing the Sustainable Use of Pesticides Regulations (S.I. 155 of 2012), which focus on reducing harmful impacts of pesticide usage on human health and the environment — and on reducing the risk of such impacts. Key elements include training and registration of professional users, distributors and advisors; testing of pesticide-application equipment; and promoting the use of Integrated Pest Management. This is supported by an enforcement programme, including inspections and checks at wholesale and retail distribution points and at the premises of farmers, local authorities, golf clubs and other end-users, to ensure that only approved products are placed on the market and that they are used responsibly. The DAFM also chairs the National Pesticides and Drinking Water Action Group (NPDWAG), which is described in Section 8.1.1. The NPDWAG will coordinate its activities with those of the RBMP National Technical Implementation Group (NTIG) chaired by the EPA, as appropriate.

The DHPLG has overall policy responsibility for drinking-water regulations, the preparation and implementation of RBMPs and the oversight and support of local government. The DHPLG will maintain a strong policy oversight of the implementation of the drinking-water source protection process outlined in this RBMP.

The 2016 EPA report on public drinking-water supplies [48] concluded that the quality of drinking water in public supplies remains high (99.9% microbiological compliance and 99.5% chemical compliance). However, persistent pesticide failures have been detected in some supplies. Small numbers of supplies also had exceedances of microbiological and nitrate standards. MCPA, which is used for rush control in grassland, was the most widely detected pesticide. Required actions identified by the EPA included putting in place a plan to protect drinking-water sources and abstraction points from pesticides and to promote the responsible use of pesticides.

Actions are already underway to deal with persistent pesticide failures in the catchments of several drinking-water supplies. These are outlined below. In relation to the management of risks to drinking water from other pollutants, such as nitrate and cryptosporidium, Irish Water is currently addressing these risks by means of treatment or other measures, rather than by source protection. However, Irish Water is continuing to carry out source-risk assessments and will determine the extent to which additional source-protection measures may be needed in the future.

48 Drinking water report for public water supplies 2016. Environmental Protection Agency.

Drinking Water Source Protection Priorities for Public Water Supplies in the 2nd-Cycle RBMP

Irish Water and the EPA have reviewed the latest information and, as of January 2018, have identified 53 surface drinking-water supplies where pesticide standards have been exceeded. Priority action is required for 4 of these, due to persistent exceedances of the pesticide drinking-water standard over 4 or more months during the pesticide-spraying season. These are the catchment areas for the Abbeyfeale supply (extending into Kerry, Cork and Limerick), the Longford Central water supply (extending into Roscommon and Leitrim), the Kilkenny Troyswood water supply (extending into Kilkenny and Laois) and the Newcastle West water supply (extending into Limerick and Cork). While the standards are precautionary and minor exceedances do not pose an immediate risk to human health, action at local level is required to reduce the risk of persistent pesticide exceedances. The remaining 49 water supplies had less frequent exceedances and require investigation and, where necessary, follow-up action to prevent further exceedances.

The DAFM has established a National Pesticides and Drinking Water Action Group (NPDWAG), the purpose of which is to support the achievement of compliance with the Drinking Water Directive pesticide standards both at the point of abstraction and in treated water. The NPDWAG does this by enhancing collaboration (including linkages with other national groups), raising awareness, tracking progress and activities by relevant stakeholders, serving as a forum for escalating responses to particular problems/ constraints, identifying policy and implementation gaps, sharing information, standardising health advice and ensuring that appropriate measures are taken in the RBMP.

The Action Group membership includes the DAFM, the DHPLG, Irish Water, the EPA, the National Federation of Group Water Schemes (NFGWS), local authorities (including LAWCO), the HSE, Teagasc, the Irish Creamery Milk Suppliers Association, the IFA, the Federation of Agrochemical Retail Merchants, the Animal & Plant Health Association (APHA), the Golfing Union of Ireland, the Golf Course Superintendents Association of Ireland, the Association of Landscape Contractors of Ireland and the Hardware Association Ireland.

Two catchment-based initiatives will be undertaken during the second RBMP cycle to address existing non-compliance issues relating to the 53 drinking water supplies mentioned above. The initiatives will be led and co-ordinated by various organisations, as described below in this section. Progress will be reported to the NPDWAG.

Priority Public Water Supplies with Persistent Pesticides Exceedances

An intensive monitoring programme will be undertaken within the 4 catchments prioritised by Irish Water and the EPA, namely the following water supplies: Abbeyfeale, Longford Central, Kilkenny Troysland and Newcastle West. This will be funded by companies participating in an industry-led MCPA product-stewardship scheme, which is being co-ordinated by the APHA. The results of the monitoring will inform the development of appropriate measures, if necessary, and the identification of specific areas for the targeting of such measures. The DAFM is considering the potential use of extended no-spray buffer zones in these catchments, if monitoring results indicate that such a measure is necessary to ensure that drinking-water quality is protected to the required standard. The Agricultural Sustainability Support and Advisory Programme (ASSAP) led by Teagasc (as referred to in Section 7.1) will provide support in promoting best environmental practice in pesticide use in these catchments. Irish Water will establish a drinking-water-source protection team for the second river basin management cycle. This team will provide a coordination function across stakeholders and activities and any other support that it considers necessary to achieve a successful outcome.

Pilot Source-Protection Programme for Public Water Supplies

Through its drinking-water-source protection team, Irish Water will co-ordinate a pilot programme on a subset of the remaining 49 water supplies, which showed less frequent exceedances of the pesticides standard. It is acknowledged that this list may change as monitoring will identify sources where exceedances arise and disappear over time. The pilot programme will trial innovative monitoring and management strategies aimed at reducing the risk of pesticide contamination of drinking waters. These strategies will include the use of passive sampling technologies to identify sources of contamination and to track the effectiveness of management measures.

A workshop will be organised before mid-2018 at which the NPDWAG stakeholders will select the pilot water supplies from the 49 identified. In selecting the water supplies for the pilot programme, consideration will be given to the overlap with existing priorities, such as the

190 Areas for Action identified through the Regional Committees (see Section 10), as well as to resource requirements and availability. Management options may involve a combination of behavioural-change initiatives across the various stakeholders and, where appropriate, enforcement action by the DAFM in relation to the sustainable use of pesticides. In deciding on the optimum combination of management measures, consideration will be given to the knowledge and experience gained from other similar initiatives undertaken by stakeholders in the past to address breaches of the drinking-water standards. The details of the pilot programme will be developed within the planned workshop.

The strategies developed during the pilot source-protection programme will be extended — for implementation by relevant stakeholders — to other drinking-water supplies identified as *At Risk* from pesticide failures.

8.1.2 Private Group-Water Supplies

Since its establishment, the NFGWS has advocated the "source-to-tap" approach to drinking-water-services provision and has developed a HACCP (Hazard Analysis and Critical Control Points) based Quality Assurance System that is now in use throughout the sector.

The objective of the NFGWS is to complete source protection plans for approximately 380 privately sourced, regulated group-water schemes (GWSs) in the country. In 2012, the NFGWS developed a comprehensive strategy for source-protection planning for the privately sourced GWSs. The aim of this strategy was to assist the GWSs in putting in place their own scheme-specific source-protection plans. This has been undertaken in collaboration with the GSI (for groundwater sources) and the Dundalk Institute of Technology (for surface water sources).

Phase 1 of this work commenced in 2013. This phase involved the development of preliminary source-protection assessments, catchment mapping and Zone of Contribution (ZOC) delineation. This work has now been completed on the majority of GWSs and is due to be completed on approximately 40 more schemes in 2018.

For Phase 2 of this project, it is proposed to develop full source-protection plans from the data collected during Phase 1 for all regulated, privately sourced GWSs. Phase 2 will commence in 2018 and will be completed over a five-year period. A plan of action to identify the work involved and the associated costs is currently being completed by the NFGWS. To date, 8 GWSs have been identified to pilot this phase of the project, including 1 large surface water catchment in County Monaghan and 7 groundwater ZOCs in County Roscommon.

The proposed approach to Phase 2 is that GWSs located in the Areas for Action identified by the Regional Operational Committees will initially be prioritised for completion of source-protection plans, along with GWSs outside of these areas that have particular source-protection issues. Each plan will aim to inform GWSs about potential hazards within the catchment, to develop a raw-water monitoring programme, to identify practical source-protection measures to be undertaken by the GWSs and to create awareness within the catchment about overall WFD objectives and the importance of protecting the drinking-water source. In addition, any primary schools connected to these GWSs will be prioritised for the continued roll out of the NFGWS "All about Water" education programme. GWSs will be actively encouraged to educate their wider membership — through the distribution of GWS newsletters and information leaflets — about the importance of protecting all water bodies, including the GWS source. The GWS will also encourage better maintenance of domestic waste-water.

8.2 Supporting Water Conditions for Natura 2000 Sites

In relation to water-dependent habitats and species protected under the Birds and Habitats Directive, the role of the river basin management planning process is to contribute to achieving water conditions that support Favourable Conservation Status. In preparing this RBMP, the risk assessment carried out by the EPA for these water-dependent Natura 2000 protected areas has focused on the risks to the water standards/objectives established for the purpose of supporting Good Ecological Status (GES). GES, which is the default objective of the WFD, is considered adequate for supporting many water-dependent Natura 2000 protected areas. The Freshwater Pearl Mussel is the exception, and more stringent water-condition standards have been established in law to protect this species. However, it is recognised that this may need to be reviewed in certain cases, if and when new evidence becomes available.

By definition, the habitats and species listed on the Birds and Habitats Directives are the most threatened and vulnerable across Europe. Some of the listed water-dependent habitat types and species are particularly sensitive to environmental pressures, and water standards/objectives may not be sufficient to support favourable conservation status in all cases. In other cases, additional water-related parameters may be needed to support favourable conservation status. Ecological Quality Objectives have been developed and established in legislation for Freshwater Pearl Mussel populations in Special Areas of Conservation designated for their protection, including additional quality elements and standards (see proposed actions below). Specific objectives for Special Protected Areas (SPAs) have not been determined at this stage, and a default objective of achieving good status has therefore been applied.

Priority is being given to addressing those protected areas that are considered to be not meeting the required water conditions. These will be prioritised for further investigation and follow-up action, as necessary. Follow-up action may include implementing supporting measures and/or undertaking additional monitoring or research. The Department of Culture, Heritage and the Gaeltacht (DCHG) and the EPA have identified 2 priority protected habitats with sensitive ecosystems that may not be sufficiently protected by the water-quality standards for GES. These are marl lakes and oligotrophic lakes. During this second cycle, the DCHG and the EPA will prioritise these two habitats for investigation and will develop appropriate environmental supporting conditions. These will be used as a basis for informing future management measures, where necessary.

8.2.1 Planned Actions in Relation to Designated Freshwater Pearl Mussel Areas

In the case of designated Freshwater Pearl Mussel areas, supporting water-quality conditions equivalent to High Ecological Status have been established. The DCHG produced a national conservation strategy for the species in 2011, which prioritised implementation of measures at a catchment scale for 8 Freshwater Pearl Mussel populations that collectively make up 80% of the total national population. Hydromorphological impacts, sedimentation and enrichment are the main pressures causing Freshwater Pearl Mussel populations to be in a conservation condition classified as unfavourable.

During this second cycle, protected areas have been prioritised for supporting measures, where necessary. These measures will include the establishment of designated Freshwater Pearl Mussel Areas. In 2018, under the national conservation strategy for the Freshwater Pearl Mussel, the DAFM, in collaboration with the DCHG, is launching a €10 million Locally Led Agri-Environment Scheme (LLAES) for the above mentioned 8 designated Freshwater Pearl Mussel areas for priority action. Funded through the Rural Development Programme, the LLAES will adopt a "bottom-up" approach to partnership and will build on the experiences of the KerryLIFE project, which focused on the Caragh and Kerry Blackwater catchments. The scheme will target up to 800 participants. Envisaged interventions include:

- Changing drinking water access away from rivers
- Preventing animal access to rivers using fencing
- Changing locations for holding livestock on farms
- Changing timings of certain farming activities to reduce risks of pollution
- Surrendering riparian land for the scheme
- Reversion of land to wetlands
- Planting broadleaf trees to prevent sediment and nutrient flow into any watercourse

In line with the national conservation strategy, the DAFM will finalise and implement its Plan for Forestry & FPM in Ireland, incorporating a Forest Management Framework to identify the level of risk associated with an individual site and to select appropriate actions to address that risk. To achieve this, it is envisaged that this framework will include a wide range of innovative approaches, including native woodland establishment, conversion to continuous cover forestry, the use of natural regeneration, temporary forest road construction, cable extraction and forest removal. The Native Woodland Establishment Scheme (i.e. the Woodlands for Water model) and the Native Woodland Conservation Scheme, both available under the Forestry Programme 2014–2020, are likely to be key supports for the implementation of the proposed Plan within both the Priority 8 Freshwater Pearl Mussel Catchments and the other 19 Freshwater Pearl Mussel catchments.

During this second cycle, the DCHG will review and revise, as necessary, the National Conservation Strategy, incorporating the findings of the above initiatives as well as the results of relevant monitoring and research programmes. Site-specific conservation objectives for Freshwater Pearl Mussel SACs have already been published for a number of SACs, and the DCHG will publish conservation objectives for all Freshwater Pearl Mussel SACs by the end of 2018. The DCHG will also continue to monitor and report on the condition of Freshwater Pearl Mussel populations and their habitat, and will undertake prioritised, practical conservation measures. These measures may include actions within the National Peatland Strategy, assisted breeding, further population genetic studies and guidance regarding the assessment of the ecological impacts of proposed projects.

8.3 Strategy and Actions to Protect our High-Status Waters

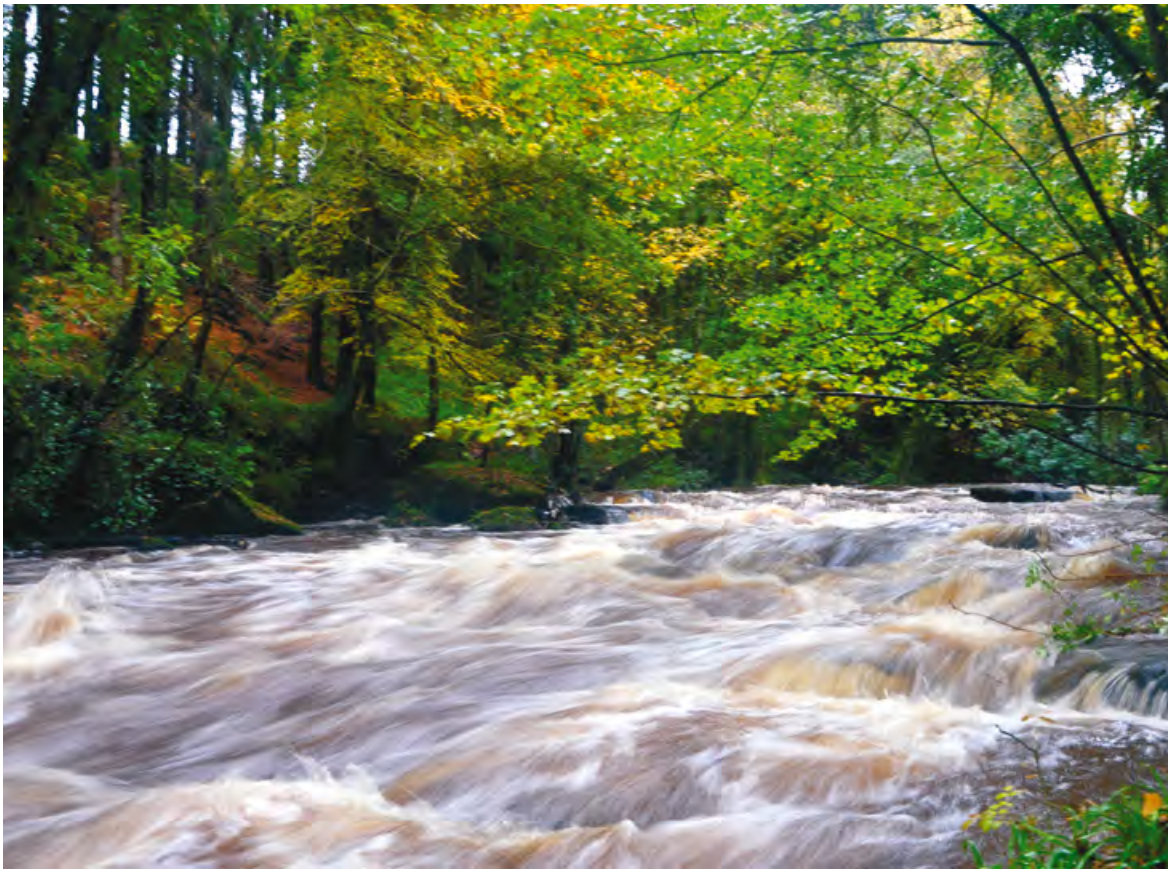
The protection of high-status waters is one of the main priorities of this RBMP. High-status waters very often serve as tributaries and headwaters for larger water bodies. This RBMP places a particular emphasis on the protection of high-status waters as one of its top priorities and, where possible, looks to provide the framework for restoration to high-status of some water bodies, where deterioration has occurred since the beginning of the first river basin management planning cycle.

The key challenges are to consider restoring water bodies that have declined to below high-status since the beginning of the first planning cycle, to protect high-status water bodies that are at risk of declining and to monitor environmental pressures that may cause other high-status water bodies to deteriorate. Monitoring has shown that some water bodies are close to the high-status/good-status boundary and alternate between high-status and good status, occasionally having moderate status. It is, therefore imperative to keep track of real improvements or declines in these water bodies, and to manage them appropriately as high-status objective water bodies.

8.3.1 High-Status Objectives

As outlined in Section 5 of this Plan, there are a total of 384 water bodies with a high-status objective. Of these, 243 water bodies are considered to be *Not at Risk* of achieving their objective, with the remaining 141 water bodies classified as either *At Risk* or *In Review*. These 141 water bodies will be the principal focus of actions designed to ensure that they achieve their objectives over the course of this plan cycle, and beyond. Of these 141 water bodies, 64 are within the list of Areas for Action prioritised in Section 5 of this plan for further investigative assessment and, where necessary, implementation of measures in order to achieve their objectives. Measures with a secondary focus on high-status waters (e.g. Green, Low-Carbon, Agri-Environment Scheme, forestry measures) will continue to be implemented, where appropriate, in the 77 water bodies outside the Areas for Action.

Within the Areas for Action, there is potential for 39 of the 64 water bodies to achieve their high-status objective by 2021, with the remaining 25 water bodies potentially failing to achieve high status due to uncertainties over the pressure(s) affecting the water body and the appropriate measures to be implemented. This uncertainty will be reduced as the investigative assessments provide clearer information about the significant pressures.



8.3.2 Measures to Protect and Enhance High-Status Waters

Existing measures aimed at protecting and enhancing high-status waters have been developed in recent years to address significant pressures both individually and in-combination. These measures include the Green, Low-Carbon, Agri-Environment Scheme (GLAS), forestry measures, the domestic waste-water treatment system (DWWTS) inspection plan and the Nitrates Action Programme. These measures will continue to be promoted in high-status catchments during this plan cycle.

In this Plan, a number of new measures have been developed where protection and enhancement of high-status waters is the primary objective. These include the Sustainability Support and Advisory Programme; an extension to the DWWTS grant scheme for houses posing a risk to high-status waters; the establishment of a *"Blue Dot Catchments Programme"*; and the development of a LIFE Integrated project. These measures are outlined in the sections below.

Agricultural Measures

The GLAS agri-environmental scheme, administered by the DAFM, has the protection of waters as a key objective and has been modified to enhance its contribution to the protection of high-status water bodies. Priority access to the Scheme is provided to farmers whose landholdings are bounded by a high-status water bodies. Participation in GLAS is then conditional on the farmer undertaking water-protection measures, including (as appropriate) the establishment of riparian margins and the erection of fencing to prevent cattle access. The water-protection measure has the second-highest uptake of all GLAS measures. (Further details on GLAS are given in Section 7.1).

In relation to the continuing pressure on water bodies from agriculture, the DAFM has funded a research project called HARMONY[49]. Led by Teagasc, HARMONY is investigating the impact of agriculture in high-status catchments. The project aims to integrate agri-environmental research with socio-economic tools to provide evidence-based measures for nutrient management in these sensitive catchments. Agriculture in these areas is typically extensive, and inadequate nutrient management on farms can cause a significant pressure in sensitive catchments. The research has identified a low uptake of soil testing and nutrient-management planning within each

49 https://www.teagasc.ie/environment/water-quality/harmony/

catchment, which leads to inefficient fertiliser use and poor redistribution of nutrients across the farm. The inefficient use of fertilisers leads to a significant risk to water quality, and the findings of the research so far point to the need for targeted agri-environmental advisory support for farmers in these areas in order to achieve greater Phosphorus-fertiliser-use efficiencies and to reduce risks of losses to waters. Complementary to the findings of the project is the new provision in the GAP Regulations, 2017, limiting the application of Phosphorous on organic soils, which will have a strong correlation with high-status catchments.

The Sustainability Support and Advisory Programme, outlined in Section 7.1.2, will offer this targeted advice to farmers in the Critical Source Areas (identified by local authorities and the EPA) to encourage and support behavioural change, to facilitate knowledge transfer, to assist in implementing measures under this RBMP and to achieve improvements to water quality in high-status water bodies.

Forestry Measures

Recent forestry policies have been clearly aligned with the objectives of the WFD. These include changes in relation to replanting policy (as set out in the DAFM's *Felling & Reforestation* Policy document) and to the availability of support schemes from the DAFM, which have now been tailored to include water-protection measures. These include the Native Woodland Establishment Scheme, the Native Woodland Conservation Scheme and the Environmental Enhancement of Forests Scheme (the latter is being finalised at the time of publication of this Plan). The mandatory Environmental Requirements for Afforestation, released in December 2016, include enhanced provisions for water protection during afforestation and early forest development. In addition, the Native Woodland Establishment Scheme promotes the establishment of water-related ecosystem services produced by a combined water-setback and native-woodland zone. Consideration is being given to how the measures can be targeted and promoted in priority catchments, such as catchments for high-status rivers or lakes.

Further details are given on forestry measures in Section 7.3.

Grant Scheme for Domestic Waste-Water Treatment Systems

The new EPA National Inspection Plan (2018–2021) for DWWTS, will focus a higher number of inspections on *At Risk* water bodies within the aforementioned Areas for Action, where DWWTS are known to be a significant pressure. This will capture a large proportion of the 64 *At Risk* water bodies with a high-status objective outlined in Section 8.6.1 within the DWWTS Inspection programme.

The proposed DWWTS Grant Scheme outlined in Section 7.1 of this Plan is specifically designed to remediate DWWTSs that have either been identified through the National Inspection Plan as defective or identified by the EPA as potentially posing a risk to high-status waters. Once a DWWTS is located within the delineated catchment area of a high-status water body and is in need of repair, upgrading or replacement, the householder will automatically qualify for the grant (subject to satisfying other eligibility requirements).

Establishment of a "*Blue Dot Catchments Programme*"

A *"Blue Dot Catchments Programme"* will be established in early 2018, with the aim of protecting and restoring high ecological status to a network of river and lake catchments.

The Programme is to provide a means of focusing attention and resources across a range of agencies in this regard. The Programme will be developed in parallel with, and integrated into, the measures outlined in Section 8.6 in order to minimise and, where possible, eliminate pressures on high-status waters. In addition, it will be co-ordinated with the implementation of appropriate LLAESs (including the Freshwater Pearl Mussel Scheme outlined in Section 8.5). Management of the Programme will be led by a dedicated Blue Dot Catchments Co-ordinator appointed by local authorities to support the Blue Dot Working Group.

Owing to the sensitivity of many high-status water bodies, the exact nature and location of the pressure(s) impacting in these water bodies can be difficult to determine with sufficient accuracy. As mentioned in Section 8.6.1, the

investigative assessment work to be undertaken by LAWCO Support & Advisory Team officers in the prioritised Areas for Action will be critical in ensuring that the specific measures for the protection of high-status waters are implemented correctly, and the co-ordination of that work will form a central component of the *"Blue Dot Catchments Programme"*.

A Blue Dot Working Group will be established before mid-2018 to co-ordinate and focus efforts and resources across a number of key agencies. It will include the principal stakeholders involved in delivering the sectoral measures detailed in this RBMP. This Working Group will be established at a national level, reporting to the National Technical Implementation Group, and will be chaired by Kerry County Council. The EPA will provide technical support and advice to the Group.

A workshop took place in late 2017 to bring the main stakeholders together and develop the basic principles and objectives of the *"Blue Dot Catchments Programme"*. An initial work programme has been developed for 2018 to begin the process of building recognition and awareness of the Programme and to begin to integrate it into the work that is already taking place, or that is planned under the Programme of Measures. This work programme will be led by the Blue Dot Working Group and managed by the Blue Dot Co-ordinator. It will include the following initiatives:

- Local authorities will appoint Blue Dot Co-ordinator to co-ordinate and manage the activities of the programme.
- Local authorities will develop a communications and engagement plan for the *"Blue Dot Catchments Programme"* to clearly set out its importance at local and national level.
- The Working Group will make recommendations for the management of high-status sites within water bodies with a good status objective.
- Stakeholders will co-operate with LAWCO Support & Advisory Teams to identify risks to water quality in the Blue Dot catchments through investigative assessments.
- The exchange of information within and across agencies will be improved in order to monitor activities in Blue Dot catchments (e.g. land-use change, new developments) that may result in deterioration in the future, and take early corrective action will be taken to eliminate risks to water quality.
- The establishment of community-led catchment initiatives in the *"Blue Dot Catchments Programme"* will be promoted and supported by the Working Group.
- The Working Group will assist DHPLG with the development of a proposal for a LIFE integrated project proposal (see the section below) will be facilitated.
- Research needs, to inform the management of high-status catchment areas, will be identified by the Working Group.

Beyond the initial work programme outlined above, the Blue Dot Working Group will take a more proactive role in the implementation of measures and engagement with stakeholders — especially Government Departments — to integrate the Blue Dot Programme into policy decisions around known pressures. Long-term aims of the Working Group will include:

- Linking networks of Blue Dot Catchments to ensure multiple gains from the implementation of measures and improved co-ordination across local and regional boundaries (e.g. through development plans)
- Developing a long-term strategy to improve our understanding of key drivers of high-status loss (linking with the proposed LIFE project will be key to this strategy)
- Implementing a robust strategy for the protection and improvement of high-status waters, including recommendations for development control

Developing a LIFE Integrated Project

The DHPLG is currently preparing a proposal for an EU LIFE Integrated Project on the protection and restoration of high-status water bodies. LIFE Integrated Projects are large-scale (regional or national) EU-co-financed projects that are designed to implement environmental plans or strategies. Ireland's proposal focuses on reversing the long-term trend of decline in the number of high-status river and lake sites and will be strongly linked to the development of the *"Blue Dot Catchments Programme"*.

The proposal will involve submitting a "Concept Note" (currently in development), which contains the key elements and objectives of the project, in Q3/4 2018. If the Concept Note is approved by the European Commission, the full project proposal will be submitted by Q2 2019. LIFE Integrated Project proposals can involve total funding of circa €17 million (circa €10 million from EU funds and the remainder from national sources).

8.4 High-Status Rivers and Lakes — Principal Actions for the 2nd Cycle

The following sets out the principal planned actions related to high-status rivers and lakes:

Principal Actions	
1	Existing measures — such as the GLAS scheme, forestry schemes and DWWTS inspections — will continue to promote the protection of high-status waters. Uptake of these schemes in high-status areas will be prioritised.
2	The DHPLG proposes to amend the DWWTS Remediation Grant Scheme to provide for remediation of DWWTSs that potentially impact on high-status waters within prioritised Areas for Action.
3	Recognising that protecting high-status waters is a priority, a *"Blue Dot Catchments Programme"* will be developed and implemented. This will establish a network of river and lake catchments with the shared objective of protecting and restoring high-ecological-status waters. This Programme will be integrated with wider implementation structures and will facilitate focused deployment of resources to Blue Dot catchments.
4	To develop and co-ordinate the *"Blue Dot Catchments Programme"*, a Blue Dot Catchments Working Group will be established in 2018, comprising all relevant stakeholders, and chaired by Kerry County Council. The Working Group will appoint a dedicated Blue Dot Co-ordinator for the programme.
5	The DHPLG has advanced the development of an EU LIFE Integrated Project to protect and enhance high-status waters and integrate into the work under the *"Blue Dot Catchments Programme"*. If EU funding for it is approved, this project is expected to commence in 2020.

Section 9: Economic Analysis of Water Use

This section provides a brief economic analysis of water use and a description of water services within the Irish river basin district. It provides information on the structure of water-services delivery in Ireland, together with estimates of water use by sector and of the costs associated with the provision of water services. Section 9 also outlines how forward planning takes place in the sector and how water services will be funded over the period to 2021. The planned measures with regard to economic aspects of water use are set out, and the wider context of water use in Ireland is described.

9.1 Introduction

Article 9 of the Water Framework Directive (WFD) requires member states to take account of the principle of recovery of the costs of water services, including environmental and resource costs, in accordance with the "polluter pays" principle. Cost recovery must have regard to an economic analysis of the costs associated with the provision of water services, including long-term forecasts undertaken for the purpose of Article 5 and Annex III. Article 9 also sets out the need to ensure adequate incentives for users to use water resources efficiently, and for an adequate contribution of the different water users (industry, households and agriculture) to the recovery of costs. In doing so, EU member states may have regard to the social, environmental and economic effects of the recovery of costs, as well as the geographic and climatic conditions of the region. Furthermore, Article 9 allows member states, where it is established practice, to not apply the provisions of cost recovery, where this does not compromise the purposes and achievements of the objectives of the directive.

The availability of data and research around water use in Ireland has improved over the period of the first river basin planning cycle. This is mostly associated with the water-reform programme, including the setting up of a single national water-services authority for public-water and waste-water services, including the independent economic regulation of that sector. It is recognised that there is a need to further improve the data and information relating to the sector, and the associated economic analysis of these data. This work will continue to develop over the period of the second cycle. Furthermore, it is also recognised that there is a need to improve understanding of the economics and cost-effectiveness of wider catchment-management measures that are implemented to improve water quality.

9.2 Structure of Water and Waste-Water Services Provision in Ireland

Analysis carried out by the Environmental Protection Agency (EPA) has found that 83% of people have their drinking water supplied by the public supply provided by Irish Water[50]. Prior to 2014, public water services in Ireland were delivered by 34 individual local authorities acting as water authorities. The setting up of Irish Water has established a single national water-services authority to deliver these services. This has facilitated a more integrated approach to service delivery by ensuring a more consistent and targeted approach to investment prioritisation, by driving efficiency in the delivery of infrastructure and by ensuring the development of best operational practice across public-water and waste-water assets.

A further 7% of people have their drinking water supplied by public or private group schemes. Public group-water schemes are group schemes that are supplied in bulk by Irish Water, whereas private group-water schemes abstract, treat and distribute drinking water to their members. The private group-water schemes are generally co-operative groups delivering drinking-water services to local communities in rural locations, where the high cost of providing infrastructure has made the provision of a public supply unviable. The remaining 10% of people get their drinking water from private wells.

Irish Water supplies drinking water to 83% of the population, but Census data finds that the percentage of households (66%) connected to public waste-water services provided by Irish Water is lower. The remaining 31% have either individual or group waste-water treatment systems — a figure very much in line with the scale of rural population in Ireland.

Irish Water also has around 164,000 non-domestic customer accounts, 51% of which are for water only, with the remaining 49% availing of water and waste-water services.

50 Focus on Private Water Supplies 2016, EPA 2017
http://www.epa.ie/pubs/reports/water/drinking/focusonprivatewatersupplies2016report.html

9.3 Estimated Water Demand in Ireland

With regard to water demand in the domestic sector, the metering of households has provided accurate data on water demand per property. In April 2017, the Central Statistics Office (CSO) produced the first statistical release in Ireland with regard to domestic water consumption in 2015.[51] This release was based on meter data for up to 771,348 water meters. It found average consumption of 383 litres per meter per day. This includes all private-side leakage beyond the meter; where that is occurring. This statistical release will now be produced on an annual basis and will provide an important tool for monitoring domestic consumption from the public water supply throughout the second cycle and beyond.

A more recent report by the Commission for Regulation of Utilities (CRU), the economic regulator of Irish Water, has separately determined that the average demand per dwelling is 125,000 litres per year[52]. This analysis was conducted in the light of the additional legislative requirements that were placed on the CRU, following the enactment of the recent Water Services Act 2017 on 17 November 2017. The Water Services Act 2017 amends the Water Services Act 2007. This amendment includes the insertion of new Sections 53A-53F into the Act. Section 53A requires the CRU to review and assess the rate of demand over a 12-month period for water services provided by Irish Water to dwellings, and to furnish the Minister with a report on its findings. Their first report in this regard was based on actual usage of metered customers of Irish Water in 2016. The CRU findings are generally in line with previous analyses, including the CSO publication. The slightly differing results between the CSO and the CRU are due to such factors as use of differing methodologies and periods of analysis.

With regard to water-demand by the commercial sector, 96% of the known 164,000 non-domestic accounts connected to the public water supply and/or waste-water sewer are metered[53]. Irish Water has completed the migration of non-domestic accounts from local authorities to Irish Water, and the accuracy of non-domestic data will now be improved through two programmes targeting smaller non-domestic meter-systems refurbishment and large non-domestic revenue meters. This will inform the future development of the non-domestic tariff proposals. Current estimated total demand for these non-domestic customers fluctuates in the range of 330–350 million litres per day, comprising metered and unmetered non-domestic usage. This equates to total non-domestic water demand in the range 120–128 million m^3 *per annum*.

The table below summarises estimated water demand for the public water supply provided by Irish Water for the end of 2017. It accounts for domestic and non-domestic public demand and for estimated network losses.

Estimated water use for public water services for the end of 2017	Estimated annual water use (million m^3)
Domestic demand[53]	205
Non-domestic demand[54]	124
Network losses (real and apparent)[55]	273
Operational demand (mains flushing and networks maintenance)	6
Estimated total water demand (Distribution Input)	608

Table 9.1 - Estimated annual drinking-water demand for public water services

Data for water use for by households that are privately supplied is limited. However, assuming that the CRU demand data also applies to households in private group-water schemes and to those households with individual wells, their combined total water use would be around 44 million m^3 *per annum*.

51 CSO release: Domestic Metered Public Water Consumption, 25th April 2017; http://pdf.cso.ie/www/pdf/20170505102345_Domestic_Metered_Public_Water_Consumption_2015_full.pdf

52 CRU Report to the Minister: Review of Demand for Water Services, 15 December 2017; https://www.cru.ie/wp-content/uploads/2017/12/CRU17339-CRU-Report-to-the-Minister-Review-of-Demand-for-Water-Services.pdf

53 This information is based on 2013 billing data.

54 This is a total demand figure used for losses estimation. It is based on metering data, but also includes domestic demands on group water supplies and other private networks.

55 This is a total demand figure used for losses estimation. It is different to the figures which arise from metering/billing. It is based on data provided by local authorities and includes water demand from bulk meters. It also includes estimated demand and losses on networks operated by public group water schemes and private estates.

Furthermore, the agriculture sector in Ireland is a significant water user, with total water use for that sector estimated at 153 million m^3 *per annum*. It is important to note that the vast majority (circa 90%) of water use in the agriculture sector is abstracted from groundwater and is not associated with the provision of water services.[56]

9.4 Using Water-Demand Data to Inform Water-Services Policy

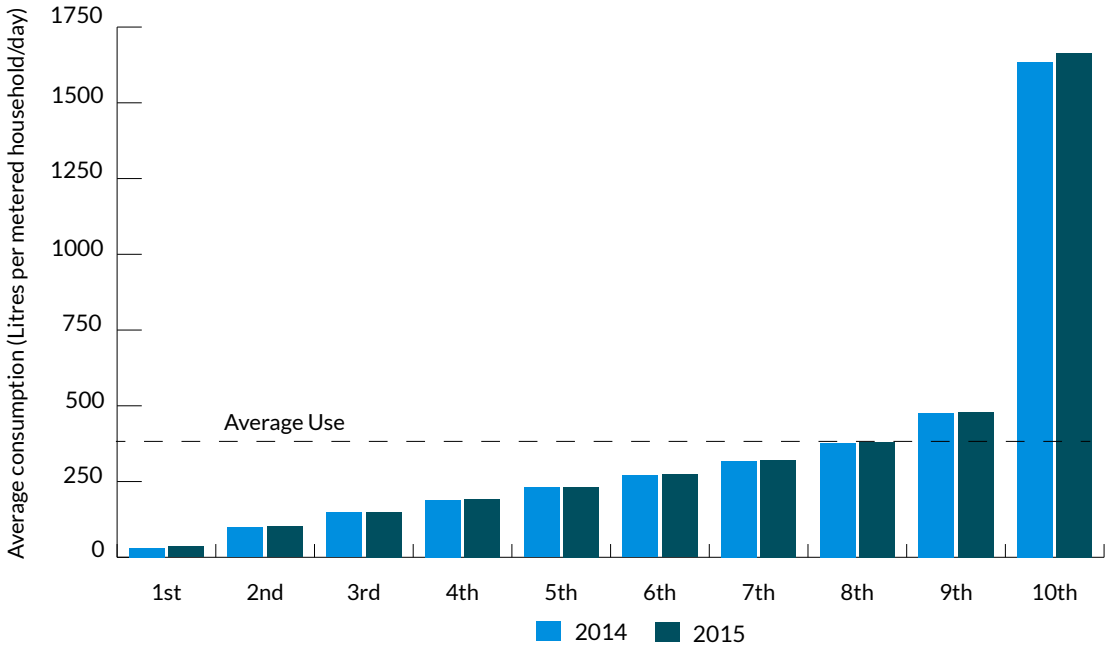


Figure 9.1 - Domestic Metered Public Water Consumption by Decile, 2014 and 2015. Source: CSO

The data on drinking-water demand for those connected to the public supply provides a clear evidence base to inform policy on improving the efficiency of water use over the coming years. The available Eurostat data shows that per capita abstraction levels in Ireland are high, relative to other EU member states.[58] The data shows abstraction of water for the public water supply in Ireland to be 135.5m^3 per inhabitant *per annum*. This is the second-highest rate of abstraction per person per annum for public water supply in the EU, which ranges from a low of 31.3m^3 in Malta to a high of 159.1m^3 in Italy.

With regard to actual consumption levels in Ireland, the data now available from water meters shows that consumption per capita in the domestic sector is very much around EU norms. The CRU's analysis of metered data for 2016 found that the average consumption per person was 47m^3 *per annum*. This was based on meter readings provided to the CRU by Irish Water. Outliers (those with exceptionally high or low consumption) were included in the analysis. Based on Eurostat data, this is very much within the range of domestic water consumption in other EU member states, and is significantly lower than consumption in many member states.

The fact that Ireland has high levels of water abstraction but also has consumption levels within EU norms is consistent with the evidence that, due to network losses, 45% of treated water is unaccounted for. The abstraction and metering data, therefore, demonstrates that addressing the extent of network losses offers the greatest potential for enhancing efficiency in the use of water from the public supply.

The metering data for households, published by the CSO and the CRU, also provides important information about the distribution of water use across households, and about how to best achieve efficiencies. Figure 9.1 (below), which is based on

56 Real and apparent losses in the public supply are estimated from the difference between treated water entering distribution, and that used by customers of the public supply and by Irish Water for operational purposes. Based on estimated total volumes of treated water entering distribution of 608m^3 *per annum*, losses (real and apparent) are estimated at 273m^3 *per annum*; which gives an indicative value of 45% of all water entering supply based on 2017 data.

57 The Water Footprint of Irish Beef and Dairy Products, Bord Bia and Cranfield University, February 2012. https://dspace.lib.cranfield.ac.uk/bitstream/1826/8756/3/The_Water_Footprint_of_Irish_Meat_and_Dairy_Products-2012.pdf

58 Eurostat Statistics Explained, Water Statistics, August 2017 http://ec.europa.eu/eurostat/statistics-explained/index.php/Water_statistics (See in particular Fig. 3 in relation to water abstraction for the public supply and Table 5 in relation to water use per inhabitant by the domestic sector in EU member states).

CSO data, presents water use by decile. The first decile represents the 10% of households with the lowest water use, and the tenth decile the 10% of households with the highest water use. The data shows that water use by the tenth decile represents 43% of all water use by households. In other words, the top 10% of domestic water users account for 43% of water consumed within the domestic sector. In its study, the CRU found that 7% of customers consume 31% of the total water demand. The CRU's analysis also found that the top 1% of metered customers use 16% of all water. The top 5% of customers use 27% of all water.

Domestic Water Usage | Highest Users (metered supplies)

Proportion of households	Approximate no. of households	% of drinking water consumed	Average daily use (litres)
Top 10%	77,000	43% 	1,665
Top 5%	38,500	27% 	2,049
Top 1%	7,700	16% 	6,071

Based on CRU and CSO analysis

Based on these findings, it is clear that the most efficient approach to ensuring more sustainable and efficient use of public water entails (1) addressing the high levels of network leakage and unaccounted for water and (2) addressing the very high level of water use at the top end of domestic usage.

9.5 Forward Planning for Public Water Services

With the setting up of Irish Water in 2014, forward planning for the provision of water services at national level has become more structured and focused. In line with the provisions of the Water Services Act, Irish Water produced a *Water Services Strategic Plan* (WSSP) in 2015. This sets out a high-level strategy to be implemented over 25 years. The strategy aims, for example, to ensure that clean, safe drinking water is provided, that waste-water is effectively managed and that economic and social development is accompanied by appropriate environmental protection and support. The WSSP was subject to two rounds of public consultation and was approved by the Minister in October 2015. A WSSP must be reviewed and updated at least every five years.

In terms of the required level of investment, the WSSP identifies a need for capital investment levels of around €600 million *per annum* "in order to achieve adequate standards of drinking water and waste-water compliance, and to support the growth of the country". This represents approximately €14 billion over the period of the Plan, as noted in the National Development Plan (NDP). Required operational expenditure is additional to this capital investment need.

The WSSP feeds into the short-to-medium-term planning that is set out in the *Irish Water Business Plan*, which covers the period 2015–2021. The *Irish Water Business Plan* sets out a strategy for meeting a number of objectives, including transforming the operational model, evolving into a high-performance utility, delivering operational cost savings of €1.1 billion over the period to 2021. A plan for the period 2019 to 2024 will be developed in the course of 2018, reflecting the *Water Services Policy Statement* which is also being published in 2018. This will be set in the context of the WSSP and the priorities set out in the NDP. The latter reflects an anticipated investment of €8.5 billion in the period to 2027. This Plan will be updated over the course of 2018. The WSSP, the current Business Plan and the NDP all set compliance with the requirements of EU directives and regulations as priorities.

9.6 Funding the Provision of Water Services in Ireland

9.6.1 Projected Costs and the Economic Regulation of Public Water Services

Prior to the setting up of Irish Water, operational and capital expenditure for the provision of water services was undertaken by 34 separate local authorities, acting as water-services authorities. In terms of these historical costs, the CSO recently published statistics for operational and capital expenditure in the sector for the period 2000–2013.[59]

Since 2014, all operational and capital costs for the provision of public water services have been incurred by Irish Water. While the *Irish Water Business Plan* sets out the planned level of operational and capital expenditure over the period 2015–2021, the actual allowed operational expenditure and capital investment are decided on by the economic regulator, the CRU.

For given regulatory periods, Irish Water submits proposed operational and capital expenditure plans (based on the WSSP and the *Irish Water Business Plan*) to the CRU. The CRU reviews these proposals, engages in public consultation and then determines the revenue that Irish Water is allowed to recover for the period. This allowed revenue provides cost recovery for operational costs and capital expenditure, and also incorporates efficiency challenges imposed by the CRU.

In December 2016, the CRU issued its decision regarding Irish Water's allowed revenue for the period 2017—2018.[60] The CRU allowed Irish Water operational expenditure of €710 million for 2017 and €685 million for 2018. These operational allowances require Irish Water to achieve efficiencies of 5% *per annum* for 2017 and 2018 within its controllable operational costs. This efficiency challenge will deliver cumulative savings to the customer of 20% over the period 2015–2018. Operational costs for the period 2019–2021 will be subject to future regulatory decisions by the CRU. With regard to capital costs, the CRU allowed Irish Water capital costs in 2015 prices of €523 million for 2017 and €629 million for 2018. This represents a reduction of 10.6% compared to the Irish Water proposal, based mainly on efficiency challenges set by the CRU. Therefore, the total allowed operational and capital costs for 2017 and 2018 are €1.233 billion and €1.314 billion respectively.

Following the CRU's 2016 decision on Irish Water's allowed revenue for 2017–2018, the Water Services Act 2017 was enacted. This legislation required additional steps to be completed in advance of the next CRU regulatory review process. These steps include the development of a water services policy statement (by the Minister) and of a strategic funding plan (by Irish Water). If the CRU's decision is to feed into the Government's budgetary process, then that decision needs to be made at an early enough point in time for this to be possible.

To allow time for these steps, the CRU decided to extend the current 2017–2018 revenue control by one year to include 2019. This means that the next revenue control will start from January 2020. It is envisaged that this will cover a five-year period and will comply with the process set out in the Water Services Act 2017. The longer period will help Irish Water to plan for and complete the work necessary to drive cost efficiencies and service improvement over a number of years. It also gives Irish Water sufficient time to make the appropriate capital investment that will enable it to deliver efficiencies over a multi-annual period.

Turning to the present period — capital investment in water services over the period of this second cycle RBMP — the chart below sets out the incurred and projected capital expenditure for the provision of public water services over the 2014–2021 period.

59 Public income and expenditure on water supply and wastewater treatment, Central Statistics Office, September 2017: http://www.cso.ie/en/releasesandpublications/er/iews/incomeandexpenditureonwatersupplyandwastewatertreatment2013/

60 Irish Water Second Revenue Control 2017-2018, Decision Paper, CER/16/342, 12 December 2016, http://www.cer.ie/docs/001108/CER16342%20CER%20Decision%20on%20Irish%20Water%20Revenue%20for%202017-2018%20(4).pdf

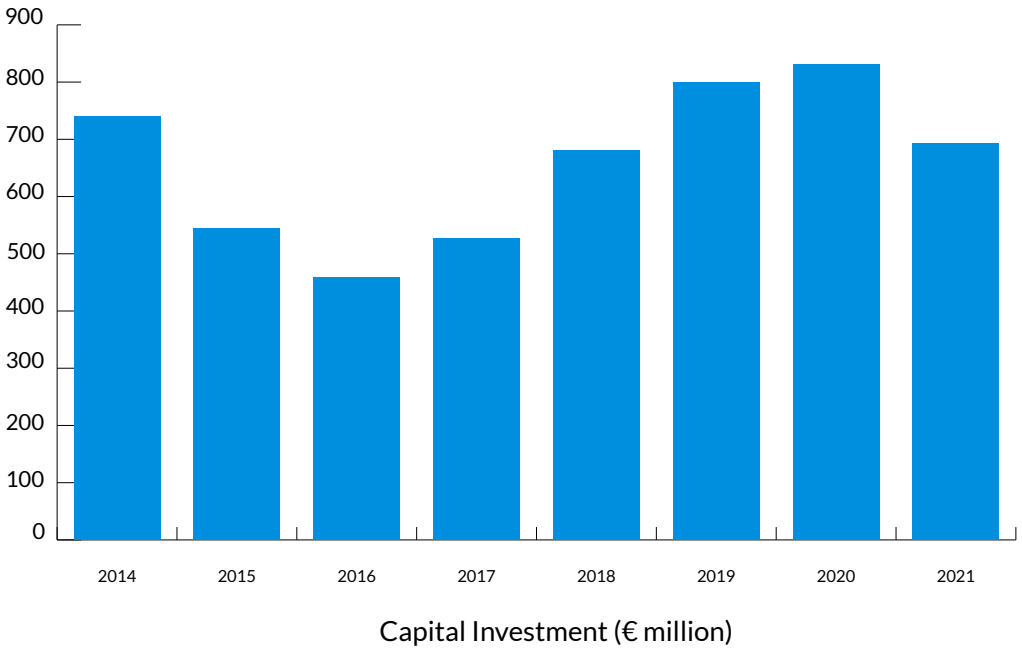


Figure 9.2 - Actual (2014 - 2017) and forecast (2018 - 2021) capital expenditure on public drinking water and waste-water

The CRU is continuously working to improve transparency in terms of its regulation both of the sector and of Irish Water's performance. An important aspect of the CRU's work is ensuring that Irish Water's revenue is spent appropriately to improve services for customers. To facilitate this, the CRU published its first *Irish Water Performance Assessment* in August 2017. A second report was published in February 2018. These CRU assessments report on a framework of 19 key performance metrics that will be used to monitor Irish Water performance and progress over time. The metrics cover customer service, environmental performance, quality of service for water supply, security of water supply and sewerage service. Future reports will be published biannually by the CRU.

9.6.2 Future Funding of Water Services and Cost Recovery

The process outlined above, whereby Irish Water develops a long-term *Strategic Water Services Plan*, supported by short-to-medium term business plans, represents a robust approach to forward planning within the sector. Furthermore, environmental regulation through the EPA and economic regulation through the CRU ensure that the plans and programmes of Irish Water are consistent with meeting environmental obligations and are delivered in an economically efficient manner. The consultative processes used to develop these plans also ensure that stakeholder input and engagement is central to plan development. Having developed the plans and structures to ensure efficient and effective delivery of public water and waste-water services, funding certainty is central to ensuring delivery progresses as planned.

With regard to commercial users, since 1998, Government's National Water Pricing Policy has been to charge non-domestic customers the full costs of providing water and waste-water services. Historically, non-domestic charges were charged and collected by individual local authorities. Since 2014, Irish Water has been responsible for service provision to non-domestic customers. For the regulatory period (October 2014–December 2016) Irish Water's revised billing estimates amounted to approximately €185 million *per annum* (2015 prices). Direct billing of non-domestic customers by Irish Water commenced in 2017.

The CRU will shortly begin a public consultation process that will establish Irish Water's Non-Domestic Tariff Framework for water and waste-water-service provision. Currently, Irish Water is applying the local authorities' non-domestic tariffs that were in place on 31 December 2013. A wide range of non-domestic tariff levels, tariff categories, billing methods, billing arrangements and billing cycles exist across the country. Over 500 non-domestic tariffs exist among 164,000 non-domestic accounts. These range from small retail outlets to large industrial connections. It is important to move towards a fairer, standardised form of non-domestic charging, similar to that

used for other services, like gas and electricity. Irish Water's tariff framework will also need to ensure adequate contribution by non-domestic water and waste-water users to recovery of water-services costs. Following public consultation, the new tariff rates are expected to be implemented towards the end of 2019.

For the period 1997–2014, the Exchequer met the capital, operational and maintenance costs for the provision of domestic public water and waste-water services. Domestic water charges were introduced on 1st January 2015. It was envisaged that revenue from domestic customers would be in the region of €270 million *per annum*. Together with non-domestic charging, which was expected to total around €230 million *per annum*, this would have resulted in total combined charges to customers in the region of €500 million *per annum*. However, the issue of charging for domestic water services remained highly contentious throughout 2015 and 2016. Following a general election in February 2016, as part of the process of Government formation, a "confidence and supply agreement" was reached that facilitated the formation of a minority Government. This agreement provided for a deliberative process regarding the future funding of public domestic water and waste-water services, and regarding the associated suspension of water charges. In June 2016 the Oireachtas voted to suspend charges to allow this deliberative process to take place. The process consisted of three stages, namely:

- An expert commission on domestic public water services was established to report on the funding of domestic public water services in Ireland and to make recommendations regarding a sustainable long-term funding model for domestic water and waste-water services. This expert commission reported in November 2016.[61]
- A special Oireachtas committee then examined these recommendations, mainly in public session, and gave its recommendations in April 2017.[62]
- Also in April 2017, the Oireachtas voted in support of the recommendations made by the special Oireachtas Committee.

The report of the special Oireachtas Committee covered a range of areas, including funding and cost recovery; public engagement; the role of regulators; compliance with EU law; conservation measures; equity and fairness; metering; and future review of the proposed strategy.

The provisions of the committee report have now been legislated for, as required, in the Water Services Act 2017[63]. Among other things, the legislation provides for the following:

- The Minister is to prepare a water services policy statement setting out the policy objectives and priorities of Government in relation to the provision of water services, including meeting obligations to protect and enhance the environment.
- Irish Water is then required to submit to the Minister a multi-annual strategic funding plan that will include an estimate for the operational and capital costs associated with the provision of water services in line with the water services policy statement. The strategic funding plan will outline the arrangements and measures to implement the 25 year *WSSP* over the period of the funding plan.
- This strategic funding plan will be approved and published by the Minister (with or without modification). This will set out the proposed funding for Irish Water for the period of the plan and will give funding certainty to Irish Water. The funding estimates in the strategic funding plan will remain subject to full economic regulation by the CRU.
- Commercial water users will continue to be subject to full cost recovery.
- Up to a designated threshold, the costs for service provision to domestic users will be met through central government funding. The threshold will be set at 1.7 times the CRU's estimated rate of demand by a dwelling. The CRU's analysis has determined the average rate of demand by a dwelling to be 125,000 litres *per annum*. The threshold amount is therefore set at 213,000 litres per dwelling *per annum*. Customers that use water above this threshold will be charged for the excess portion demand. The CRU is empowered to carry out regular reviews to calculate average

61 Report on the funding of domestic public water services in Ireland (November 2016) http://www.oireachtas.ie/parliament/media/committees/futurefundingofdomesticwaterservices/Report-of-Expert-Commission-on-Domestic-Public-Water-Services.pdf

62 Oireachtas Committee report on the future funding of domestic public water services in Ireland (April 2017) (http://www.oireachtas.ie/parliament/mediazone/pressreleases/2017/name-41671-en.html

63 Water Services Act 2017, Number 29 of 2017, enacted on 17 November 2017 http://www.irishstatutebook.ie/eli/2017/act/29/enacted/en/html

consumption, and provision is made that the multiplier of 1.7 may be reduced in time but not within the first 5 years, and not without a positive resolution of the Oireachtas.

- Domestic water use above this threshold will be subject to a charge, the level of which will be set by CRU, taking account of the cost of water-services provision.

Other recommendations of the Committee, for example, ensuring the most effective combination of water metering, will be implemented administratively. It is also important to note that the water services policy statement, prepared by the Minister, will frame future iterations of the *WSSP* and future business plans prepared by Irish Water.

9.7 Promoting Efficient and Sustainable Water Use

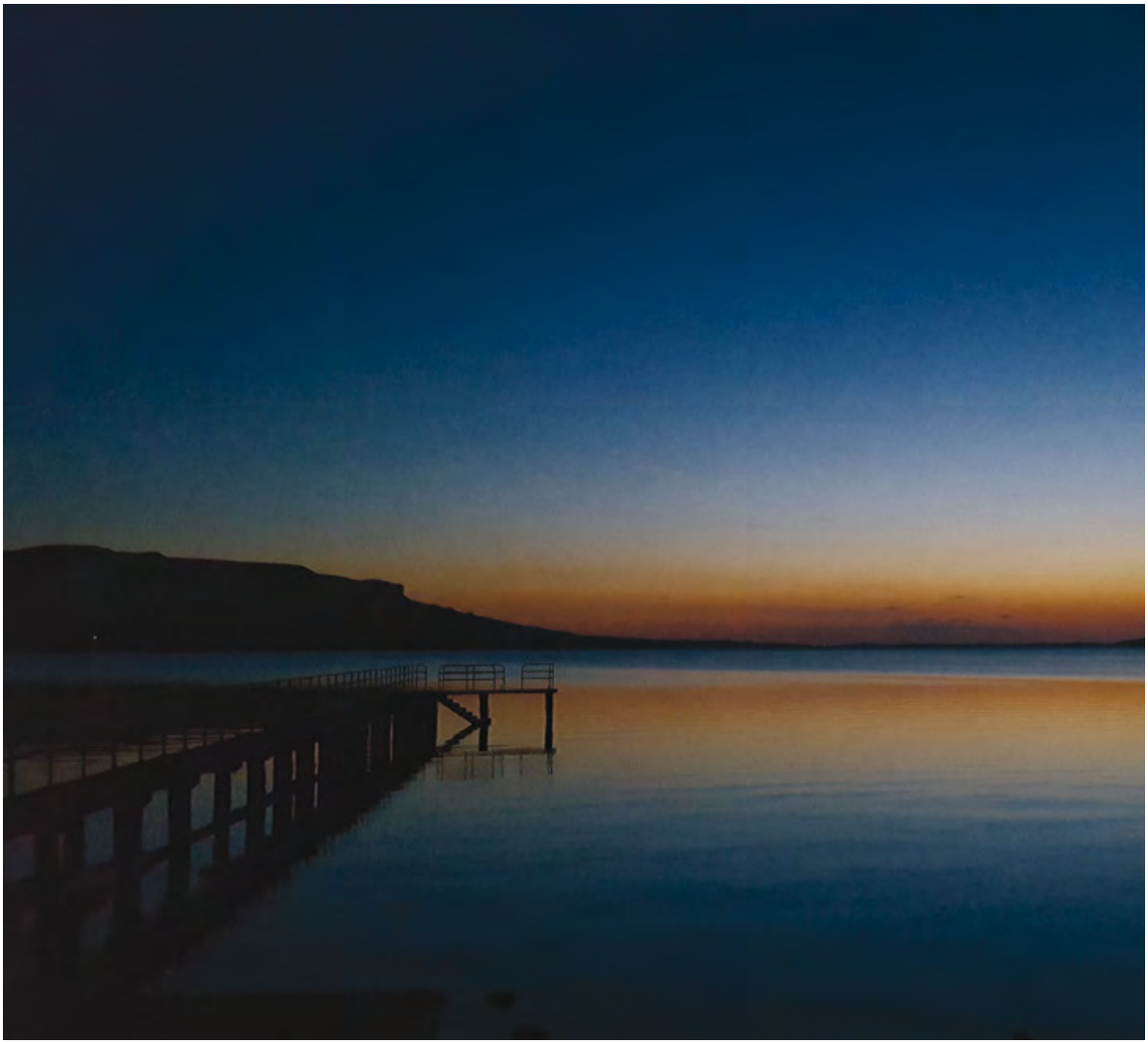
Promoting the efficient and sustainable use of water is central to the policy now in place. As outlined above, the two key aspects of the approach are (1) reducing the high rates of network losses and (2) having a charging mechanism in place where domestic users consuming water above the agreed threshold are subject to a charge. A number of important measures to promote efficient and sustainable water use are planned for the period 2018–2021. The following list sets out some of the most important measures:

- Up to 2021, Irish Water plans to invest around €73 million *per annum* to reduce leakage. A range of interventions are being implemented, including pressure-management activities, active leakage-control measures, water-mains renewals and continued customer-side savings. These interventions are targeting around 61 million m^3 *per annum* of water to be saved by 2021 against the 2017 baseline.
- Domestic water use above the threshold outlined above will be subject to a charge, the level of which will be set by CRU, taking account of the cost of water-services provision. This will ensure that pricing mechanisms incentivise efficient use in the domestic sector.
- Metering is recognised as key to having the necessary data and tools to implement this policy. Irish Water intends to continue extending the penetration of metering in the domestic sector while also upgrading the quality of non-domestic metering. In this regard, provision has been made for a programme of metering of multi-user dwellings and for the fitting of meters on new and refurbished properties. Within the leakage programme, high domestic usage will be addressed in two ways. For metered households, the excess usage charge provisions will apply and a free "First Fix Free" scheme will continue to be offered. This scheme has saved some 100 million litres per day since 2015. Customers of Irish Water that do not have a meter will also be liable to a charge if they use water excessively. Leaks on unmetered properties will be identified through district meters, through the metering of multi-user buildings and in the course of network-leak detection. Such properties will be offered a meter (where practicable), and a first-fix repair. Should further action be required, the leak will be addressed through the provisions of the 2007 Water Services Act, which allows Irish Water to take action to ensure that the leak is fixed.
- Ultimately, the purpose of such measures is to ensure that water is used sustainably and that the provision of water services does not impact on the achievement of the objectives of the WFD. Irish Water's implementation of the *National Water Resources Plan* (outlined in section 7.7.2) will ensure a better understanding of the pressures on water bodies due to water-services provision and will facilitate improved management of our natural water resources, where required.

9.8 Wider Cost-Effectiveness of Measures

In line with normal public-spending procedures, individual programmes and projects proposed for this river basin planning cycle are subject to the cost-effectiveness analysis or cost-benefit analysis normally carried out prior to investment being made. While measures must be implemented across all the sectors identified in the RBMP as causing significant pressures to water bodies, investment in urban waste-water treatment is one of the more significant areas of expenditure proposed. As has been outlined, the effectiveness and efficiency of expenditure in this area is ensured through the economic regulation of Irish Water by the CRU. This is further strengthened through the process of prioritisation and alignment of planned expenditure in urban waste-water in terms of the policy objectives set out in the RBMP.

In terms of more general measures, and in particular of broad-based measures to support water-quality improvements, it is acknowledged that the assessment of cost effectiveness was not strong enough during the first cycle of river basin management plans. This is something that will need to be rectified in this cycle, and the strengthened and co-ordinated management structures that are now in place to oversee delivery of the measures included in Ireland's *River Basin Management Plan* (RBMP) for 2018–2021 will ensure that the implementation and effectiveness of measures can be more carefully monitored, so that cost-effectiveness analysis can be undertaken. This will better inform decision making with regard to the development of future measures.



9.9 Economic Analysis and the Sustainable Use of Water — Principal Actions for the 2nd Cycle

The following sets out the principle actions related to this area:

Principal Actions	
1	As the economic regulator of Irish Water, the CRU will approve Irish Water costs and continue to drive efficiencies within its cost base. For example, Irish Water is required to deliver efficiencies of around 20% within its base controllable operating expenditure over the period from the start of 2015 to the end of 2018.
2	The CRU will also monitor Irish Water's delivery against money spent and will publish information to improve transparency in this regard. In particular, the CRU will publish Irish Water Performance Assessment Reports on a half-yearly basis.
3	The CRU will continue to work towards establishing and implementing a harmonised suite of non-domestic water and waste-water tariffs that will benefit customers in terms of transparency, equity and simplicity. Similar work is being progressed by the CRU in relation to introducing a harmonised suite of charges for connection to the water and waste-water systems. The regime will continue to be based on ensuring full cost recovery from non-domestic water and waste-water users.
4	The cost of domestic services provision will be met through central government funding up to a threshold of 1.7 times the amount assessed by the CRU as the average consumption of each domestic customer. Domestic water use above this threshold will be subject to a charge, the level of which will be set by the CRU, taking account of the cost of water-services provision. This charge will serve to address the very high usage levels amongst a small number of domestic users as demonstrated by the analysis undertaken by both the CRU and the CSO. The other key focus for efficiency in water-services provision is reducing leakage. Investment of €73 million is planned to reduce leakage by 61 million m^3 *per annum* by 2021 against 2017 levels, and thereafter to sustainable economic levels.
5	Irish Water will implement its *National Water Resource Plan*. This will ensure the better understanding and long-term management of abstraction pressures arising from the provision of water services and will support the continued sustainable management of our water resources.
6	The economic analysis will be further developed on an ongoing basis throughout the second-cycle river basin management plan to ensure that wider water-quality measures implemented during this cycle will be monitored with regard to their cost and effectiveness in order to better inform the development and implementation of future measures.

Section 10: Implementation Strategy

This *River Basin Management Plan* (RBMP) sets out a range of actions aimed at moving towards the objectives of the EU Water Framework Directive (WFD). In terms of devising a strategy for implementation, it must be acknowledged that the planned actions are diverse, involve multiple stakeholders and will be implemented taking account of available resources. Planned actions range from national measures implemented by national authorities (such as the Irish Water Capital Investment Plan and the Nitrates Action Programme) to sub-catchment management and water-body specific measures that need to be refined and implemented at a local level. New initiatives — including the Agricultural Sustainability Support and Advisory Programme, the extended Domestic Waste Water Treatment Systems Grant Scheme and the Forest Service native woodland schemes — as well as planned initiatives, such as the preparation of planning and water guidance, which is underway, and the development of Natural Water Retention Measures will all assist local authorities in driving water-quality improvements at the local level. In addition, such measures as the National Dairy Sustainability Forum represent a stakeholder-led approach to WFD implementation that was not developed during the first cycle. Furthermore, the vital role of monitoring implementation is also recognised, as is the need for further investigation and the refinement of measures where the exact cause of impact on water status is not yet fully understood. A specific challenge, therefore, is the efficient and effective allocation of the available resources between implementing measures, carrying out further characterisation and monitoring.

The lessons from the first cycle, set out in Section 1 of this RBMP, point to more success in implementing measures through national policy and programmes than through water-body-specific measures. It is also apparent that the measures successfully implemented tended to be those driven by a single authority, for example, the Nitrates Action Programme and cross-compliance inspections. Furthermore, in assessing the first cycle of the RBMP, the European Commission observed that "there was no single body having ultimate responsibility" and also that "fragmented institutional structures, poor intra and inter-institutional relationships and capacity" undermined the ability both to develop and to implement plans.

Finally, the public consultation process for developing the RBMP has identified the need to improve approaches to, and structures for, communication — and to do the same for public and stakeholder engagement. Significant efforts have been made to consult on the draft RBMP. The consultation process included over 120 public information meetings, organised by the Local Authority Water and Communities Office (LAWCO). As a result, 938 submissions were received directly by the Department, and LAWCO received over 1,000 local submissions. Of the submissions received, 87 referred to the need for improved co-ordination across public bodies, 52 to the need for improved co-ordination of plan implementation and 43 to the need for improved public engagement.

The strategy and structures now put in place with regard to the implementation of this second-cycle RBMP aim to address these issues. Significant improvements in terms of providing the public and other stakeholders with information have also been made in the context of implementing this plan. These include the development of the catchments.ie website, the publication of regular catchment newsletters and the publication of the prioritised areas for action maps on the watersandcommunities.ie website. The proposed actions to improve this area are set out in Section 11 of this RBMP.

10.1 High-level Implementation Strategy

As noted in Section 5 of this RBMP, 44% of our water bodies meet, or are expected to meet, the requirements of the WFD. For these water bodies the full implementation of existing measures, along with continued monitoring, is expected to be sufficient. In relation to High-Status-objectives water bodies, a specific programme called the *"Blue Dot Catchments Programme"* has been established to manage the environmental pressures on water in these catchments. A working group is to be established in Quarter 2 2018 and will be chaired by Kerry County Council (see Section 8.3.2).

For those water bodies *At Risk* of not meeting the requirements of the WFD, better targeting of existing measures and the implementation of additional supplementary measures will be carried out. The targeting of measures will be driven at regional level and will be based on the evidence from the catchment characterisation process, on the objectives and priorities set out in this plan and on wider socio-economic and feasibility considerations in order to arrive at an agreed

prioritisation of actions for the period of this plan. This process is designed to be dynamic and to be adaptable to new information as it becomes available through further characterisation and assessment.

The implementation structures have been cognisant of the following challenges:

- Actions range from national measures by national authorities right down to locally devised solutions for individual water bodies.
- Co-ordinated action is required by the many competent public bodies. There is potential for better targeting of existing measures through such co-ordination.
- Actions need local-, regional- and national-level co-ordination and management to ensure that the appropriate measures are implemented in the right places to achieve the required outcomes.
- It must be ensured that ownership of actions rests in the right place, and that those responsible for implementation of actions have the knowledge, expertise, authority and resources necessary to implement the actions.
- Where necessary, voluntary approaches must be supported by effective enforcement.
- Further characterisation and assessment work is necessary for those water bodies where the risk is not yet fully understood. Scientific assessments are required for such water bodies to refine this understanding so that the right measures can be targeted, but this need will be balanced with the requirement to implement measures where positive environmental outcomes are anticipated, such that the best use of resources is ensured.
- The actions delivered, the resources associated with those actions, and the resultant impacts on water quality will be monitored and reported on in an effective and efficient manner that makes the optimal use of technology.
- Plans, actions, and progress will be communicated effectively and in a timely and transparent manner at national, regional and local level.

10.2 Implementation Structures

Based on the challenges outlined above, and building on the reformed structures (Figure 10.1) used to develop this plan (outlined in Section 2), the arrangements set out below are being used to implement this cycle of the RBMP. Although, for the purposes of this Plan, the working arrangements are set out formally to ensure successful implementation, it is fully recognised that integrated and co-operative working relationships between stakeholders will be the key to success. As such, all bodies associated with the development of this plan will endeavour to adopt an ethos of actively participating and working together, on a day-to-day basis and through the governance structures outlined, to develop and deliver integrated catchment management on the ground. To this end, Operational Committees have been established by each of the five local-authority Regional Committees.

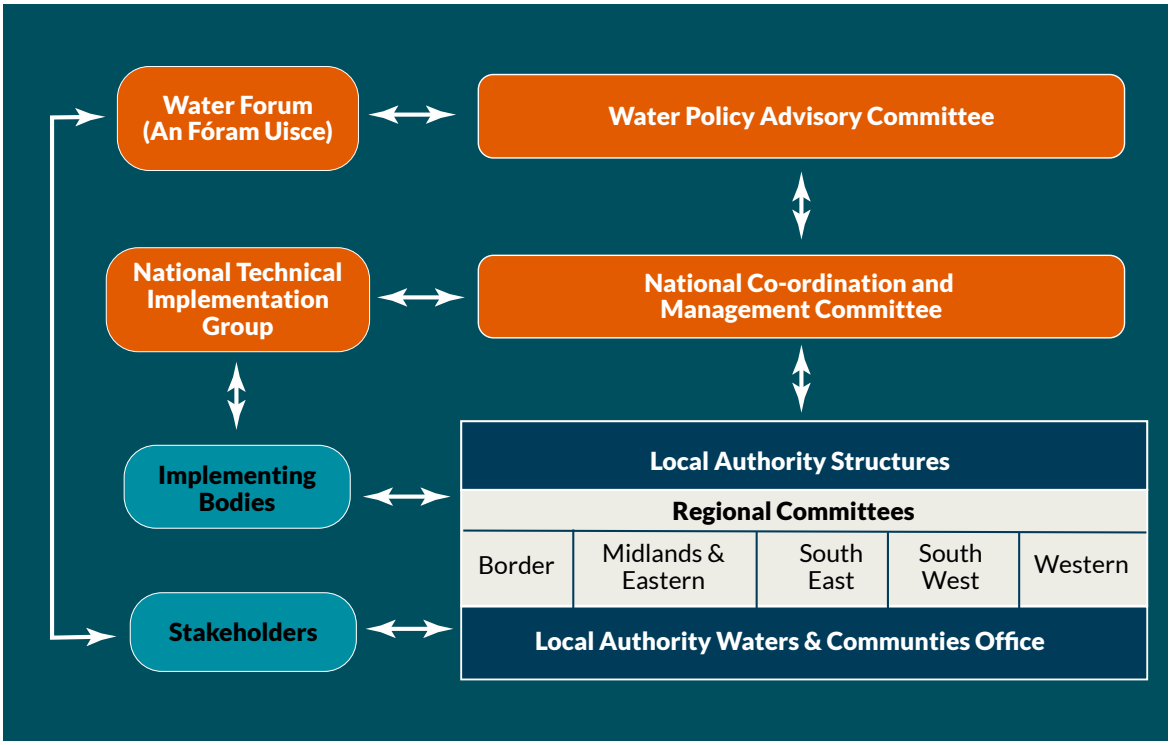


Figure 10.1 - Governance and co-ordination structures for implementation of the second-cycle RBMP

Water Policy Advisory Committee (WPAC)

The existing WPAC, established in 2014 as part of the structures for preparation and implementation of the RBMP, will provide high-level policy direction and monitoring of implementation over the period of this RBMP. The WPAC will also advise the Minister with regard both to progress of the plan and to the preparation of programmes of measures necessary to achieve the environmental objectives. The WPAC will continue to be chaired by a representative of the Minister, currently an Assistant Secretary of Department of Housing, Planning and Local Government (DHPLG).

Water Forum (An Fóram Uisce):

The Water Forum was formally established in 2017 under the Water Services Act 2017 (No. 29). It is an independent entity and has discretion to determine its own work programme and the means of communicating its views and analysis. The Forum's functions are broad and include advising the WPAC in relation to river basin management plans on matters pertaining to the objectives of the WFD, and on related matters concerning the management of the inland aquatic environment and water resources. As requested by the Minister, the Forum may also examine other water-related matters, including the carrying out of research concerning those matters, and advise the Minister accordingly.

The Forum can consist of between 20 and 40 members (including a chairperson). There are currently 26 members on the Forum, representing organisations and sectors with an interest in water issues. These include consumer groups; Irish Water consumers; community groups; rivers trusts; groups that participate in aquatic activities, such as fishing and water sports; sectors with a particular interest in water issues, such as the agricultural and business sectors; the community and voluntary sector; the environmental sector and organisations representing rural Ireland and the group water scheme sector. The Forum provides an interface between science, citizen/stakeholder engagement and water policy.

The National Co-ordination & Management Committee (NCMC)

The WPAC has established a National Co-ordination and Management Committee (NCMC) to ensure the Programmes of Measures is actively managed over the period of implementation of the plan and to embed the partnership approach taken in developing the draft RBMP. The NCMC provides the necessary interface between science, policy and programme delivery. It agrees and oversees the overall work programmes and reports to the WPAC on progress. The NCMC will address potential obstacles to implementation and, when required, will advise the WPAC on future policy needs. The NCMC will also be responsible for overseeing the preparation of future River Basin Management Plans and Programmes of Measures on behalf of the WPAC. The NCMC is chaired by the DHPLG and comprises representatives of the DHPLG and the Environmental Protection Agency (EPA) together with chairs of the regional committees.

The National Technical Implementation Group (NTIG)

The NTIG oversees technical implementation of the RBMP at a national level and provides a forum to ensure co-ordinated actions among all relevant State actors. It also addresses any operational barriers to implementation that may arise. The group is chaired by the EPA, and membership includes the local authorities, the OPW, the Inland Fisheries Ireland (IFI), Teagasc, the DAFM, Irish Water, the DHPLG, the Forest Service, Coillte, the NPWS and other implementing bodies, as appropriate. The NTIG will review progress on an on-going basis, providing the NCMC with updates on the implementation and effectiveness of measures. The NTIG is also a forum for information exchange and for promoting the consistency of regional implementation. As the body that is statutorily responsible for reporting on the WFD, the EPA will co-ordinate ongoing tracking of the implementation of actions and will, in conjunction with others and by means of the monitoring programme, undertake assessment of the effectiveness of those actions. The group will continue to have the structures and resources of NIECE (Network for Ireland's Environment Compliance and Enforcement) available to it through the Catchment Management Network that was established in 2014.

Regional Local Authority Structures

The 5 local authority regional committees, supported by LAWCO, have responsibility for co-ordinated delivery of measures at regional and local level and ensuring a consistency of approach across the regions. The 5 regional committees are chaired at Chief Executive level, with active participation and technical advice from the EPA. Each committee is supported by an Operational Committee with membership drawn from all the relevant public and implementing bodies and chaired at Director of Service level.

The five Regional Committees will each produce a Regional Integrated Catchment Management Programme for the period of this RBMP (2018–2021). Work on these programmes is ongoing. The programmes will set out the areas prioritised for action at water-body, sub-catchment and/or catchment level, as appropriate. The prioritisation process identified 190 Areas for Action for cycle 2. The list of prioritised Areas for Action is provided in Appendix 1. The table will be reviewed annually as new data becomes available and/or new priorities are set. The first review, already underway, is assessing submissions on the draft RBMP received from members of the public following the feedback and engagement process. The regional programmes will also set out the measures to be implemented in each relevant area and the responsible bodies to enact these measures. They will also set out how communities and other stakeholders will be engaged with and included.

The local authority structures will be central to tracking the progress and effectiveness of implemented measures. They will, for example, provide annual reports on progress. The local authority structures also have a vital role in supporting national policy development and implementation through their participation in the WPAC and the NCMC. As outlined in more detail in this section, the Local Authority Waters and Community Office (LAWCO) also has an important role in these structures, not least in terms of ensuring public and stakeholder engagement with the implementation of measures at regional and local level. The resources within

LAWCO, including the services of a dedicated community-funding adviser and the establishment of a new Community Water Development Fund administered by LAWCO will enable local authorities to promote and support locally led community initiatives aimed at driving local water-quality improvements.

These implementation structures build on the successful elements of the first cycle, while also addressing shortcomings with regard to local and regional implementation, national oversight, public engagement and communication. The structures to improve public engagement and communication are outlined in the next section and include the setting up of the Water Forum, the outputs of which will inform work at all levels of the implementation structure.

While national authorities — such as DHPLG, DAFM, Irish Water, the EPA and others — will continue to drive implementation of national measures, the regional structures will help these authorities to better co-ordinate and target the implementation process. Ultimately, however, the decision making for such measures rests with the competent national authorities, because they must prioritise at national level, in the context of wider socio-economic and affordability concerns.

Local Authority Regional Support & Advisory Teams

To implement the Regional Integrated Catchment Management Programmes, local authorities are putting in place regional support and advisory teams to carry out scientific assessments and to drive the implementation of mitigation measures at local level. The support and advisory teams will be in place in early to mid-2018 and will form part of LAWCO. Recruitment for up to 53 scientific personnel commenced in Quarter 1 2018. Staff will be assigned to each of the five regions. Additional specialist expertise will be sourced as required, whether from other implementing bodies with the relevant expertise, by the recruitment of additional scientific staff or by the procurement of expert consultancy support.

The initial focus of the new Support and Advisory Teams will be to build on the work of the catchment workshops by carrying out further assessments in order to characterise each area for action to a field/site-scale level. This will allow mitigation measures to be targeted solely on the areas that require them. One of the key objectives of the RBMP process is implementing *the right measure in the right place*.

Further assessments will initially be desk-based, but, where necessary, these will be followed by field-based investigations. These assessments will aim to verify and clarify existing information or provide new information about a specific topic or issue that is poorly understood or that was flagged as requiring further investigation in the workshops. Further assessments are iterative in nature, whereby new information is progressively collected and assessed as the understanding of risk, impacts and the effectiveness of specific measures, improves.

Guidance and a training programme for the regional support and advisory teams are currently under development to ensure that procedures applied at local level are rigorous and consistent.

Main steps for Further Assessment of Areas	
1	Assessment of the latest scientific data available, including the catchment characterisation reports, will be undertaken to get an in-depth understanding of each area for action. Consultation with relevant public bodies.
2	Data gaps or gaps in understanding of the risks in the catchment will be identified.
3	Scoping and planning of the further assessment that is required will be carried out. The planning exercise will aim to minimise the areas within the Areas for Action that require further assessment. It will also identify any water-quality monitoring programmes that should be implemented.
4	Prior to commencing field work, the Support and Advisory Teams will organise public meetings to inform local stakeholders and the general public about the work programme and to gather any additional local information that may inform the process.
5	Information on and understanding of the catchment will be further reviewed and updated.
6	Streams and rivers will be walked and surveyed within the areas for action, and findings on a field and site scale will be logged using the WFD App tool. During catchment surveys, observations will be recorded, photographs taken, and sampling carried out, where appropriate. Information and opinions from local land owners will be obtained.
7	Once the field work is completed, the data gathered will be analysed and interpreted, along with all existing data. Appropriate mitigation actions will be identified. Additional water-quality monitoring programmes may also be recommended.
8	Consultation will take place at the local level to identify the optimum mitigation actions required to achieve the necessary water-quality improvements.
9	The Support and Advisory Teams will provide ongoing support and advice regarding the implementation of mitigation actions within the areas for action.
10	Suitable performance indicators for tracking progress will be designed. The Key Performance Indicators (KPIs) will be monitored and used to track progress.
11	The Support and Advisory Teams will report on the outcomes of the further assessment in the area for action. The Support and Advisory Teams will provide feedback to stakeholders.

The assessments applied at local level can be categorised into 10 general types, as described in Table 10.1. Depending on the complexities involved, the timeframes required to complete assessments will range from days to months.

Category	Investigative Assessment & Measures Evaluation
1	Further information provision (e.g. from IFI, local authorities, EPA)
2	Point source desk-based assessment
3	Assessment of unassigned status water bodies, requiring field visit(s)
4	Regulated point sources, requiring field visit/s
5	Stream (catchment) walk to evaluate multiple sources in a defined (1 km) river stretch (used as the basis for estimating resource requirements)
6	Stream (catchment) walk in urban areas
7	Stream (catchment) walk along >1 km river stretches
8	Stream (catchment) walk along high ecological status (HES) objective rivers
9	Lakes assessment, requiring field visits
10	Groundwater assessments, requiring field visits

Table 10.1 - Categories of investigative assessment

The output of the further assessment process and consultations at local level will be a list of the optimum combination of mitigation measures considered necessary to address each of the significant pressures in a water body. Through the Regional Operational Committee, a plan will then be put in place with the relevant implementing bodies to implement the measures.

This process will be developed over time as new and relevant information become available, and as implementation proceeds. It is anticipated that the content will be amended and adapted based on field experiences and needs.

Mitigation Measures

The Local Authority Water Support and Advisory Teams will have a number of resources and a suite of mitigation measures available from which they can draw and promote at the local water body scale. These are briefly outlined below. In order to address many of the issues that are expected to be encountered at local level, a number of working arrangements and protocols for dealing with sectoral issues have been agreed through the RBMP governance and coordination structures. Where widespread systemic environmental risks have been identified but no suitable corrective or mitigation measure is available, these issues will be referred up through the RBMP governance structures for resolution at the appropriate level. Where there are clear existing conflicts between water policy and other policies — such as agricultural or land-use policies — these conflicts will be referred to the WPAC, with recommendations for resolution.

A number of resources and mitigation measures will be available to the Support and Advisory Teams to drive water-quality improvements at a local level, depending on the pressures that they identify at the local scale. These measures are as follows:

1. Where agriculture is contributing to water-quality problems, advisors from the Agricultural Sustainability Support and Advisory Programme will be deployed to provide advice and support to farmers in Critical Source Areas (CSAs) in order to secure compliance with the requirements of Nitrates Action Programme (NAP) and to promote best environmental practices. Some of the management measures at farm level may simply require changes in practices. Other measures — such as intercepting pollutant inputs to waters— are likely to entail more direct intervention.
   Several schemes and initiatives are in place or underway that, depending on local circumstances, may be suitable to deploy at a local level to bring about water-quality improvements. In the case of agricultural lands within the Areas for Action, it is envisaged

that the agricultural-sustainability advisers will be trained and well versed in the range of support schemes available to farmers and will be in a position to advise on the most suitable mitigation measures available to address the risks identified on the farms in question. Existing schemes include the Targeted Agricultural Modernisation Schemes (TAMS) and the Forest Service Native Woodlands Schemes.

Work has also commenced under the direction of the National Technical Implementation Group (NTIG) to develop a suite of Natural Water Retention Measures (NWRMs) that can be used as mitigation measures to address water-quality problems as part of the programme of measures set out in the second-cycle RBMP. It is expected that the NWRMs will provide multiple benefits in relation to water quality, biodiversity, climate-change adaptation, fisheries, landscape-amenity objectives, etc. Some flood-attenuation benefits are also anticipated.

2. The grant scheme to assist owners of premises connected to domestic waste-water treatment systems (DWWTSs) with the costs of repairing, upgrading or replacing such treatment systems will be extended so as to target and promote the uptake of the scheme in the 190 Areas for Action and catchments with High Status objectives. Where the Support and Advisory Teams identify defective DWWTSs, they will be in a position to notify property owners and advise them of their obligations regarding the maintenance of their systems, including desludging. Where repairs, upgrading or replacement are necessary, the Catchment Assessment team will advise the property owner regarding the available grant and how to apply.
3. Where the Support and Advisory Teams identify problems with urban waste-water discharges they will inform Irish Water through the RBMP governance and coordination structures. Irish Water will review the operation of the relevant plants and aim to address any operational issues identified. Where Irish Water judges that small capital works are required, it may consider carrying out these. Where significant works are required, Irish Water will consider timelines for including the works in future capital investment cycles, subject to agreement with other authorities.
4. Where acute impacts of existing forestry on waters are identified by the Support and Advisory Teams these will be dealt with on an inter-agency basis. New mobilisation measures and protocols have been developed between the Forest Service, local authorities and the EPA. These are described in the document *Forestry and Water: Achieving the Objectives and Priorities under Ireland's River Basin Management Plan 2018-2021*. Apart from dealing with acute impacts of existing forestry on water quality, the aim of the new mobilisation measures and protocols is to focus the application of a newly developed suite of forestry measures on mitigating the impact of forestry activities on water and on maximising the protection and enhancement of water quality using a number of native woodland schemes. These mobilisation measures and protocols include the following:
   - Focusing on inter-agency coordination
   - Developing training and peer-to-peer learning
   - Targeting measures in prioritised Areas for Action
   - Targeting individual forestry sites for the protection and enhancement of water
   - Putting in place a protocol for handling acute forestry and water incidents
   - Improving water-related aspects of the assessment of forest licence applications
5. In addition, LAWCO will promote community-led catchment initiatives to drive water-quality improvements at a local level. The Community Water Development Fund is available to provide initial seed funding to get projects underway, subject to a successful application being made. LAWCO also has a community funding adviser in place to assist community groups in identifying and applying for additional funding sources.

In addition to the above measures available to the Local Authority Water Support and Advisory Teams, other work that is currently underway will provide additional measures. For example, the planning and water guidance currently being prepared by the DHPLG will include technical guidance on drainage-maintenance works based on the best available environmental practices. When delivered in 2019, the Support and Advisory Teams will be in a position to promote this best practice where drainage maintenance is taking place. Local authorities will also track progress with the implementation of measures at the local level. It is expected that other water-body-specific measures will be developed and will become available over time.

10.3 Indicative Flowchart for Implementation of Local and Regional Measures

Implementation of national measures during the second cycle will continue to be driven by the competent national authorities, with input from the local authority regional structures and the EPA with regard to potential improvements or better targeting of measures. For example, it may be the case that local or regional input could improve the application of national-scale measures in specific instances. Furthermore, steps are being taken through the National Dairy Sustainability Forum and the RBMP governance and coordination structures to maximise the synergies between the Dairy Sustainability Initiative with the work of the local authority regional structures. Effectively managing competing demands for limited resources will be a key challenge, and it will be vital to ensure that the different pressures are addressed in a fair and balanced way. The following flow chart provides a framework to assist decision making on an on-going basis in relation to the prioritisation of areas for action, and to the development of associated measures at regional and local levels as new information becomes available (see Figure 10.2).

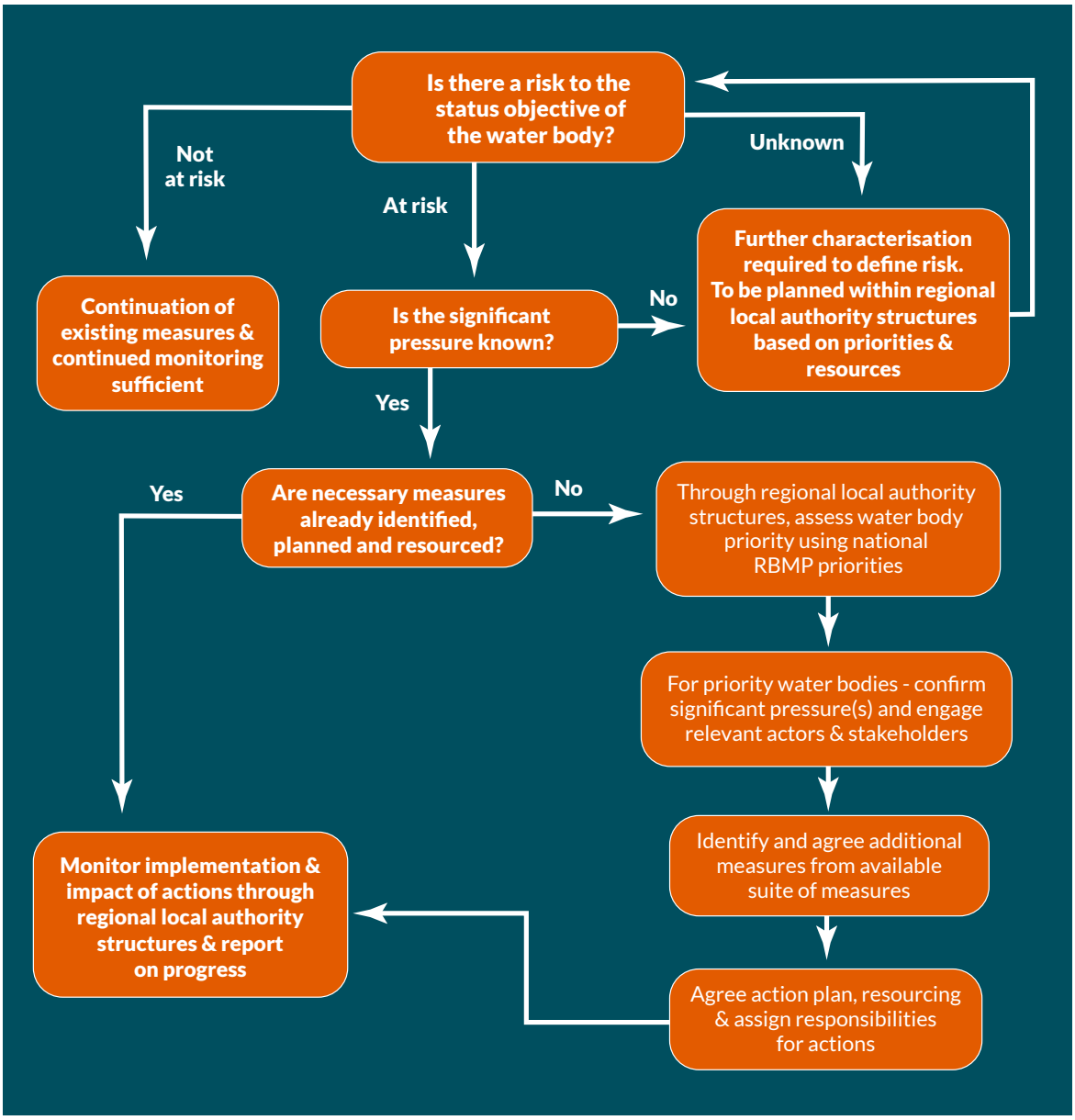


Figure 10.2 - Flow chart outlining decision making on prioritisation and associated supporting measures at a regional and local level

For those 2,113 water bodies (44%) that are meeting or expected to meet WFD requirements (i.e. those water bodies that are *Not at Risk*), continued application of existing measures, along with continued monitoring, is envisaged as sufficient. For the 1,460 water bodies (30%) *At Risk* of not meeting the requirements of the WFD, the potential for better targeting of existing measures, the implementation of best practice, and/or the prioritised implementation of appropriate supplementary measures will be explored. As previously set out, the implementation of currently available supplementary measures will be prioritised and implemented through the Regional Local Authority structures. Finally, for 1,256 water bodies (26%) where the risk is not currently understood and further characterisation is required (i.e. those that are *Under Review*), investigative assessments will be necessary, where resources allow. These will assess the risk; identify the significant pressures, where necessary; and, where appropriate, prepare a plan of action. The 4-year Regional Integrated Catchment Management Programmes will provide the appropriate framework to outline the progress planned in each regard at a regional level.

To ensure optimal implementation of this RBMP, the implementation of measures in the regional work programmes must be continuously monitored and evaluated. Each regional committee will, therefore, produce a concise annual report that will provide an update on implementation progress and an evaluation of the measures implemented. This reporting will be integrated with the WFD web-based application (See Section 10.4), insofar as is possible. These reports will be a critical input to both the NCMC and the WPAC. These annual reports will follow the structure of the regional work programmes and will outline progress with respect to the plans set out in those programmes.

10.4 Monitoring and Evaluating

The monitoring of planned-measures implementation, and the evaluation of the success of measures, will be central to ensuring effective delivery of the RBMP objectives. Although the NCMC will ultimately oversee the implementation of national measures, it will be the role of the NTIG, with the support of the regional structures, to monitor the impacts of measures at a regional and national level.

In terms of the regional and local measures, the Regional Integrated Catchment Management Programmes will set out the details of planned interventions, which can be monitored over time.

Along with other information, the programmes will provide the following:

- Details of the process used to determine the agreed prioritisation of areas and actions — along with information on outcomes of this prioritisation
- The agreed list of areas (water bodies and/or sub-catchments) prioritised for action
- Details of the planned measures for each prioritised area, of the action plan for implementation of these measures, of the responsible bodies, of the assigned resources, and of the expected implementation timelines
- Details of the expected outcome for each prioritised water body

The WFD Application (WFD APP) complements the Catchment Assessments and is the subject of a separate EPA guidance document. The WFD APP is a web-based application that is accessible through EDEN (https://wfd.edenireland.ie/) to staff from the EPA, other public agencies and local authorities engaged in WFD-related work. This application will be used to access WFD-related information (including data from the Catchment Assessments), to record information and to prepare reports as part of the Investigative Assessment process. The intent of the WFD APP is to facilitate the movement and sharing of data and information between local authorities, the EPA and other relevant public authorities at the water-body scale. Information is recorded, managed, reported and disseminated in a structured format that is consistent with EU reporting schemas.

In addition, the catchment.ie website will be a valuable source of up to-date river basin management plan information for the general public.

10.5 Co-ordination in International River Basin Districts

The Republic of Ireland and Northern Ireland are required under the WFD to co-ordinate their efforts in relation to international river basin districts. Each jurisdiction carries full responsibility for ensuring implementation of all aspects of the Directive in their national territory, including any part of an International River Basin District that lies within their national territory. On the island of Ireland:

- Substantial areas lie within cross-border river basins.
- Some waters in each jurisdiction flow into or through the other jurisdiction.
- The rivers and lakes of the island of Ireland are designated as being within a single eco-region (eco-region 17), requiring a high degree of co-ordination between the authorities in both jurisdictions to ensure consistent management of the entire aquatic environment.
- All coastal and transitional waters surrounding the island of Ireland are also included in one eco-region (eco-region 1), and their management must be closely co-ordinated.

Two river basins districts are shared with Northern Ireland. The Neagh Bann International RBD has 35 shared water bodies from a total of 407. The North Western International RBD has 85 shared water bodies from a total of 1,232. Following public consultation in 2003 in relation to IRBDs, administrative arrangements for implementation of the WFD were put in place.

These include:

- Co-ordination arrangements established by Ministers in both jurisdictions
- The establishment of the North/South Water Framework Directive Co-ordination Group under the auspices of the North/South Working Group on Water Quality
- The establishment of various technical working groups with joint representation from technical experts within state bodies (North-South rivers and lakes group, UKTAG and support groups)
- Cross-representation on respective national and RBD level groups

With regard to cycle 2, the North South Water Framework Directive Coordination Group will continue to oversee the ongoing co-ordination between the authorities in the two jurisdictions during the implementation of the management plans for the moment. Depending on the outcome of negotiations relating to the withdrawal of the United Kingdom from the European Union, under Article 50 of the Lisbon Treaty, the co-ordinating arrangements for managing shared water bodies may need to be reviewed and revised to take account of the changed circumstances.

There are 3 Areas for Action that contain cross-border water bodies in respect of which collaboration will be important. These include 21 water bodies *At Risk* and 12 water bodies *Under Review*. In addition, there are 12 Areas for Action that are wholly within the Republic, but which will contribute to water-quality improvements in water bodies that flow into the North. These include 22 water bodies *At Risk* and 10 water bodies *Under Review*.

Section 11: Communication and Public & Stakeholder Engagement

Article 14 of the EU's Water Framework Directive (WFD) requires member states to encourage the active involvement of all interested parties in its implementation, particularly in the production, review and updating of River Basin Management Plans. The Government recognises that public and stakeholder engagement with the current (second-cycle) *River Basin Management Plan* (RBMP), with its implementation, and with other water-related issues is vital to delivering the water-quality improvements identified in the Plan.

Public consultation and input is therefore central to the Plan in a number of respects. Public engagement makes a vitally important contribution to:

- Building awareness of water quality issues and water management in Ireland
- Garnering views on the water-related issues which are important to people
- Ascertaining public opinion on water policy in general, and the RBMP actions in particular
- Giving citizens and representative organisations input into the policy-making process
- Encouraging and enabling community-led water initiatives

Three public consultation processes were held in respect of the Plan: the Significant Water Management Issues consultation, which is mandated under the WFD and was held in 2015–2016; a national public consultation on the draft RBMP, held in 2017, which allowed people to give their views on the structures and measures set out in the draft document and on how the final Plan should be developed; and the Local Authority Waters and Communities Office's (LAWCO) local public consultation on the draft RBMP, which ran concurrently with the national consultation process. These processes are detailed in Section 2.4.

The consultation processes indicated strong support for public engagement; 65 submissions were made directly to the Department of Housing, Planning and Local Government (DHPLG) on the subject. Common elements in the submissions included:

- Calls for increased dialogue with stakeholders, grassroots organisations, communities and civic society on policy development and implementation
- Support for the LAWCO structure and requests for greater resourcing to enhance its work with local communities
- Calls for the enhanced provision of information and educational initiatives to communities
- Recognition of the potential value of citizen science and of community monitoring of water bodies, and emphasis on the need for initiatives to support their uptake

Addressing these issues requires structures and initiatives that can facilitate citizen and stakeholder engagement in the development of national policies and measures — and also ensure engagement with regional and local implementation on the ground. Two such initiatives have recently been put in place to help address these requirements:

- The Water Forum (An Fóram Uisce) has been established to bring together stakeholders with an interest in water quality, thereby providing an interface between science, policy and programme delivery.
- LAWCO supports the work of regional committees by coordinating the efforts of local authorities at a regional and catchment level and by engaging with local communities to promote public participation in the management of our water environment.

11.1 Water Forum (An Fóram Uisce)

Raising public awareness of water as an environmental, social and economic resource is essential to improving our management of this invaluable asset. The Water Forum is a statutory body[64] that addresses this need by providing an interface between science, citizen/stakeholder engagement and water policy. It represents stakeholders with an interest in the quality of our water bodies and consists of between 20 and 40 members (including a chairperson). It currently comprises 26 members. The Forum encourages and facilitates engagement, with a single focus on the continuous improvement of water quality in Ireland.

The Forum's terms of reference provide the opportunity to debate and analyse, among other things:

- Water as a resource
- Issues of water quality
- Rural water issues
- Issues affecting customers of Irish Water
- Implementation of the WFD

The Forum's membership includes consumer groups; Irish Water customers; community groups; river trusts; groups that participate in aquatic activities, such as fishing and water sports; sectors with a particular interest in water issues, such as the agricultural and business sectors; the community and voluntary sector; the environmental sector and organisations representing the group water sector and rural Ireland.

The Water Forum has discretion to determine its own work programme and means of communicating its views and analysis. It is primarily composed of representatives of non-state bodies, and its work and output are completely independent of government. The Forum has met 9 times since its formation in April 2017. Forum sub-groups will debate and analyse the 5 aforementioned themes.

The Forum has a key role in informing public views on the links between clean water supplies, good water quality and public health. Through ongoing debate and analysis, the Forum enhances public understanding of water as a scarce and costly resource to abstract, treat and supply — a resource that must be conserved, protected and used sustainably.

The Forum is pivotal in the context of:

- Encouraging and facilitating engagement on water issues
- Challenging policies
- Seeking the allocation of resources
- Reviewing actions and plans
- The Water Forum has a statutory function to advise the Minister for Housing, Planning and Local Government on water policy with regard to, *inter alia*, water conservation, rural water services and the interests of customers of Irish Water. The findings and outputs of the Water Forum are taken into account by both the Water Policy Advisory Committee (WPAC) and the National Co-ordination and Management Committee (NCMC), informing both national policy and the implementation of this RBMP.

11.2 Local Authority Waters and Communities Office

The Water Forum provides a means to ensure public and stakeholder engagement, and to facilitate public and stakeholder input into policy-development processes. To ensure the success of this Plan, it is also important to make sure that the public and stakeholders are engaged at regional and local level. We must enable them to get involved with catchment-based approaches to improving water quality, and with the development and implementation of measures on the ground.

To achieve this, the national Local Authority Waters and Communities Office (LAWCO) was established in February 2016. It drives public engagement and consultation with communities and stakeholders and co-ordinates these activities across all 31 local authorities. The office is operated, for all local authorities, by Kilkenny and Tipperary County Councils, on a shared-services basis. The full staff complement consists of 3 regional co-ordinators, who are further supported by 3 specialist support officers and 12 Community Water Officers located in centres throughout Ireland. The 3 specialist officers focus, respectively, on funding; communications and promotion; and technology and research.

Community engagement requires real participatory structures where communities can have their voices heard, and where they can be included in the decision-making process. LAWCO has undertaken, and continues to undertake, extensive community engagement. In the course of LAWCO's consultation on the draft RBMP, 124

64 Established under the Water Services Act, 2017

public meetings were held. The views expressed at these meetings, both verbally and in written format, have been analysed and reported to the DHPLG, providing valuable input into the policies and measures that have been added to this finalised RBMP.

A good example of the LAWCO's work is the targeted community-engagement process that was undertaken on the Suir catchment. This was a pilot project that informed the approach taken to consultation on the RBMP across the country. Meetings were convened with communities within the river Suir catchment. This engagement has provided a detailed picture of water-quality issues and brought about local engagement on a number of river initiatives in relation to such issues as biodiversity and invasive alien species, including a collaborative response to a significant crayfish-plague outbreak in the main river channel in 2017.

LAWCO has engaged extensively across local authorities through regional information sessions and meetings with management teams and Strategic Policy Committees. Significant engagement has also taken place with representative groups and structures through Public Participation Networks, Local Community Development Committees, LEADER Groups and Partnerships, sectoral interest groups, rural development companies, the Irish Local Development Network and wider community groups.

Another facet of LAWCO's work is putting in place the Local Authority Water Support and Advisory Teams to carry out scientific assessments and drive implementation of mitigation measures at local level. In early to mid-2018, 53 scientific personnel are being put in place to carry out this work across the five regions. Their role will encompass public and stakeholder engagement; prior to commencing field work, the Teams will organise public meetings to inform local stakeholders and the general public about the work programme and to gather any additional local information that may inform the process. To identify the optimum mitigation actions required to achieve the necessary water-quality improvements, consultations will take place at the local level with those involved in addressing water-body pressures. The Support and Advisory Teams will provide ongoing support and advice to stakeholders in the implementation of mitigation actions within the areas for action.

Access to funding is an important element in mobilising and empowering communities to take on a greater role in the management of their local water environment. LAWCO provides local authorities, community and voluntary groups with technical advice and assistance in relation to local, regional, national, EU and corporate funding streams with a connection to water management. A LAWCO funding advisor is in place to help in this regard. Catchment initiatives in which strong community collaboration is evident include the EU LIFE Programmes such as DuhallowLIFE, MulkearLIFE and BurrenLIFE. Such collaboration is also taking place throughout the country under the LEADER programme.

LAWCO will play a key role in further enabling community water initiatives, through management of the Community Water Development Fund (detailed below in Section 11.3), which will provide enabling funding for community water initiatives that align with the aims of the RBMP.

11.3 Community Water Development Fund

The involvement of the public at local community level can yield successful and sustainable outcomes in support of improved water quality and associated multiple benefits. The DHPLG has committed to the creation of a Community Water Development Fund (CWDF), which will be managed by LAWCO. The CWDF will support community water initiatives with a particular focus on measures that are aligned with the priority actions in this Plan. It will thereby play an important part in enabling active local involvement in the implementation of the WFD, as envisaged under Article 14.

The CWDF, which will be accessible to community groups who wish to engage in water projects, will be administered by LAWCO through a service-level agreement with the DHPLG. Oversight of the fund will be conducted by an evaluation committee drawn from the relevant public agencies.

The priorities contained in the RBMP will guide the selection of projects, and extra weighting will be given to projects within the Prioritised Areas for Action (PAAs) as defined within the Plan. The fund will target actions in 3 main areas:

- Development projects, such as feasibility studies and planning reports
- Support for Rivers Trusts and equivalent community organisations and to citizen science and awareness initiatives
- Capital projects

In line with this RBMP and Ireland's commitments under the WFD, the purpose of the CWDF is to support community-based projects that will:

- Help prevent deterioration of water bodies
- Help meet the specific water-related objectives required for protected areas
- Help protect and restore water bodies with a high status objective
- Target water bodies in PAAs
- Develop sub-catchment pilot scheme
- Promote citizen engagement and raise general awareness on water-quality matters
- Support the formation of River Partnerships/ Networks/Trusts

11.4 Knowledge-Sharing and Networking

Effective catchment management requires competent authorities, stakeholders, and the public to understand and integrate a huge range of information about individual catchments. This includes information about:

- how people use the land and water bodies, and what livelihoods are supported
- the geography and geology of an area, looking at how all the water flows both above and below ground from where it falls as rain to the sea
- possible sources of pollution, including urban waste-water treatment plants, septic tanks, physical modifications, and runoff from farming, forestry and landfills
- how to identify the benefits of good-quality water in an economic and social context

A key knowledge-sharing tool for this purpose is the catchments.ie website, which was developed by the EPA. The website presents maps and data on the 46 catchments, 583 sub-catchments and 4,829 water bodies. It provides charts in respect of many water bodies, presenting trends in key biological and chemical indicators, which help people to understand how healthy the water bodies are, and the possible causes of any changes in their health status. This sharing of knowledge from the characterisation process allows for better targeting of measures. Further improvements and additional information on implementation actions are being made available via this channel during the operational period of the Plan, so that all stakeholders — particularly the public — have access to up-to-date environmental information to inform their actions. Furthermore, as implementation progresses, this website will also become a tool for the sharing of knowledge in a wider sense, by identifying and sharing best-practice examples from across the river basin district, for example. This will be complemented by the continued publication of the quarterly *Catchments Newsletter*, which will both present scientific information and highlight best-practice examples of implementation from across the country.

An additional knowledge-sharing portal is LAWCO's watersandcommunities.ie website, which sets out information on Areas for Action, and publicises the Office's work, including public engagement and events. It also provides another medium through which the public can engage with local authorities on water quality at catchment level.

Another requirement for the successful implementation of this Plan is to ensure effective knowledge sharing and networking amongst experts. While the WPAC, the NCMC and the National Technical Implementation Group (NTIG) provide forums for information sharing at a high level, it is just as important to ensure that effective knowledge sharing and networking take place at all levels. The EPA has the lead role with regard to such networking issues, and will continue to develop this over the period of this second cycle. Significant progress has already been made in this regard with the establishment in 2014 of the Catchment Management Network and a number of technical working groups established under the NTIG.

11.5 Communications and Public & Stakeholder Engagement — Principal Actions for the 2nd Cycle

The following key actions in the area of communications and stakeholder engagement will be developed over the course of the second-cycle RBMP:

Principal Actions	
1	The Water Forum (An Fóram Uisce) will facilitate stakeholder engagement at national level on all water issues, including implementation of the WFD.
2	LAWCO will drive public engagement, participation, and consultation with communities and stakeholders, and co-ordinate these activities across all 31 local authorities.
3	LAWCO will work to ensure that public and stakeholder engagement results in meaningful participation in the catchment-management approach across the river basin district.
4	The DHPLG has committed to the creation of the CWDF to enable community water initiatives that align with the aims of this RBMP.
5	The EPA will continue to lead on networking and knowledge-sharing through NIECE (Network for Ireland's Environmental Compliance and Enforcement); the Catchment Management Network, and associated working groups; the WFD application; the catchments.ie website; and the *Catchments Newsletter*. The catchments.ie, WFDIreland.ie and watersandcommunities.ie websites (operated by LAWCO) will act both as information and data repositories and as knowledge-sharing tools to allow better targeting of measures and co-ordination of implementation.
6	The DHPLG will ensure that the communication and knowledge-sharing activities of both LAWCO and the EPA are integrated with the implementation structures for this Plan and feed into both policy development and implementation.


Waters
& communities

Section 12: Water-Quality Monitoring

The Environmental Protection Agency (EPA) has overall responsibility for establishing and managing the national WFD monitoring programme. While the EPA also has overall responsibility for the design of the programme, responsibility for certain elements has been assigned by the EPA to a number of public bodies, including local authorities, Inland Fisheries Ireland, the National Parks and Wildlife Service, Waterways Ireland and the Marine Institute.

One of the main purposes of the monitoring programme is to assess the ecological health of Ireland's surface waters (rivers, lakes, transitional and coastal waters) and the quality and quantitative status of its groundwater resources. A range of biological elements — such as phytoplankton, freshwater aquatic plants, sea grass and salt marsh, river and coastal benthic invertebrates and fish — are monitored across a comprehensive network of monitoring sites (see Figure 12.1). The monitoring also involves the collection of supporting parameters on water temperature, nutrients, dissolved oxygen, acidification and salinity to assess if the environment can support these aquatic organisms. The physical condition and river flows and lake levels are also monitored. Information on the presence and levels of priority substances and priority hazardous substances in water is also monitored to assess the chemical status of these waters.

The river network consists of 3,099 monitoring sites covering 2,410 river water bodies. The lakes network consists of 225 lakes and 9 reservoirs. The groundwater monitoring network consists of 332 monitoring sites. The transitional waters network consists of 80 monitored water bodies, and the coastal waters network consists of 43 monitored water bodies. Canal monitoring is undertaken at 44 sites on the Royal Canal, the Grand Canal (including the Barrow Line) and the Shannon–Erne Canal.

Three types of monitoring are undertaken through the WFD monitoring programme:

1. Surveillance Monitoring is designed to provide an overall picture of water status across a river basin district as well as information on long-term trends.
2. Operational Monitoring is designed to provide targeted information on the status of those water bodies *At Risk* of not meeting their environmental objectives and to assess any changes in the status of those water bodies as a result of specific measures, with the aim of ensuring that the environmental objectives set in this plan are met.
3. Investigative Monitoring is a component of investigative assessments that is designed to confirm the risk classification of *Under Review* water bodies as either being *At Risk* or *Not at Risk* of meeting their environmental objectives, and for those *At Risk* water bodies to determine the pressures causing that risk and the actions needed to address the pressure.

The EPA has completed a technical review of the national WFD monitoring programme to ensure that the network is optimally designed for the second RBMP cycle up to 2021. The aims of the review were to:

- Review the existing network and its sub-networks to determine what changes are required
- Consider the need for enhanced investigative monitoring to deliver evidence of ecological impacts and inform supplementary measures
- Align the monitoring network and sub-networks with the results of the characterisation risk assessments and the knowledge gained from that process
- Review the overlap between the monitoring network and sub-networks and recommended areas for action, and assess if modifications to monitoring are required
- Consider the need for more frequent monitoring at high-status sites to support the establishment of the *"Blue Dot Catchments Programme"*
- Review and confirm responsibilities for the various sub-elements of the monitoring programme

The EPA is engaging with the key stakeholders with responsibility under the monitoring programme to ensure coherent implementation of any changes to the programme.

The EPA will undertake a number of projects during this RBMP cycle to further inform the refinement of the national WFD monitoring programme. One of these projects will involve the EPA investigating the factors contributing to the significant number of improvements and disimprovements in water status observed across approximately 900 water bodies over the first river basin planning cycle.

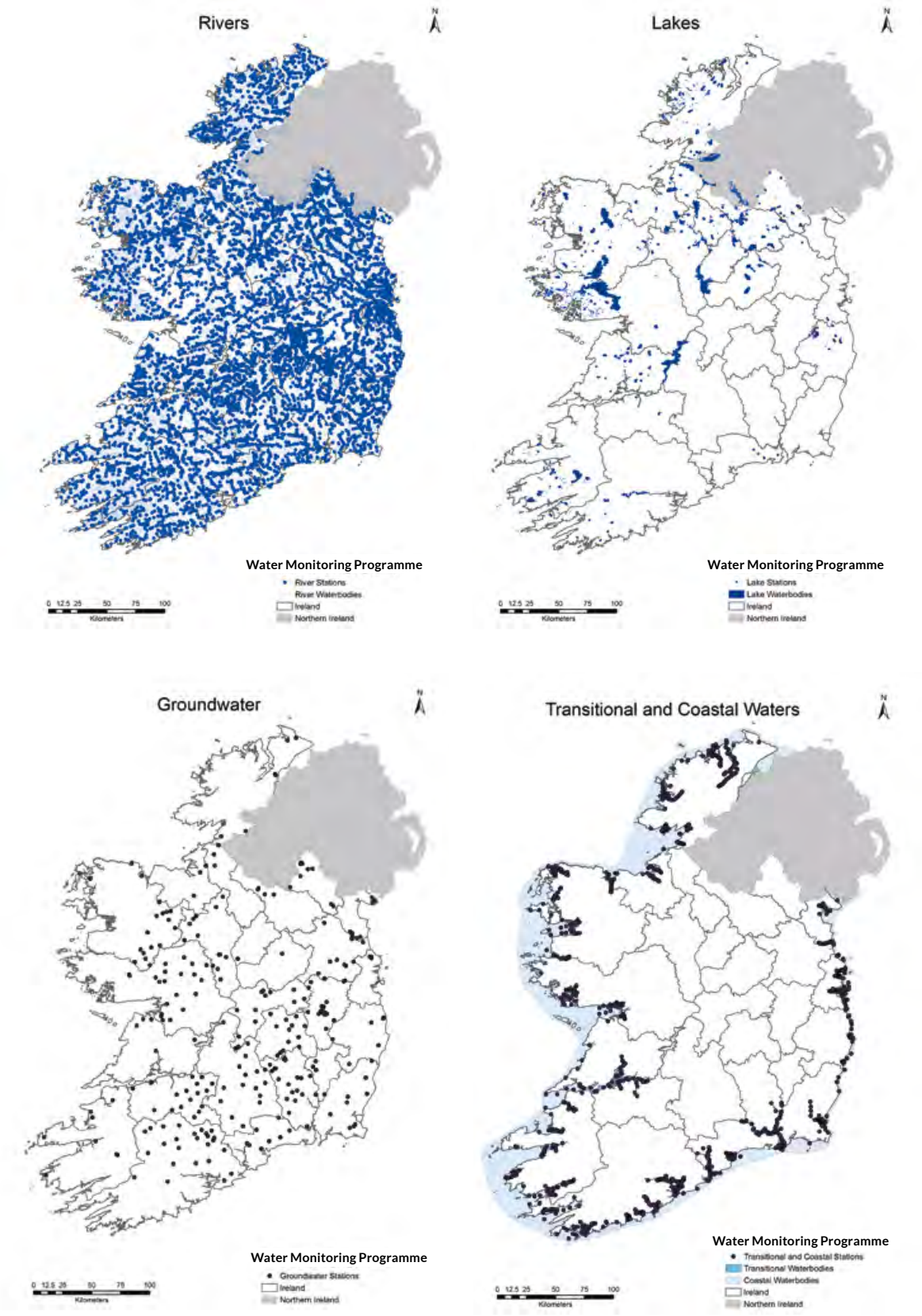


Figure 12.1 - Maps showing locations of monitoring sites across Ireland.

Section 13: Expected Outcomes of the Second-Cycle River Basin Management Plan

This *River Basin Management Plan (RBMP)* sets out the measures aimed at protecting our water bodies and at addressing the pressures on those water bodies *At Risk* of not meeting the objectives of the Water Framework Directive (WFD). The approach adopted towards implementation centres on prioritising water bodies for action and ensuring effective delivery of environmental outcomes through co-ordinated intervention across a range of stakeholders.

This approach reflects the scale of the challenge of protecting and restoring water status, and the need to make best use of available resources. As outlined in Section 6, the implementation priorities are, in summary:

- To fully implement existing directives
- To prevent deterioration
- To meet the water-related objectives for protected areas
- To protect and restore high-status waters
- To target actions in Areas for Action

These priorities are not mutually exclusive; for example preventing deterioration, achieving protected-area objectives and achieving high-status objectives have significant overlaps.

A total of 190 Areas for Action have been prioritised nationally through a series of workshops organised by local authorities (see Table 13.1 and Map 13.1). These include a total of 726 water bodies, consisting of 616 river water bodies, 89 lakes, 14 estuaries and 7 coastal water bodies.

Decisions on priority Areas for Action were made through the local-authority-led regional structures, supported by the EPA's scientific analysis and evidence-base. Decisions took into account the priority objectives set out in this plan and also had regard to the available scientific evidence and to wider socio-economic and feasibility considerations.

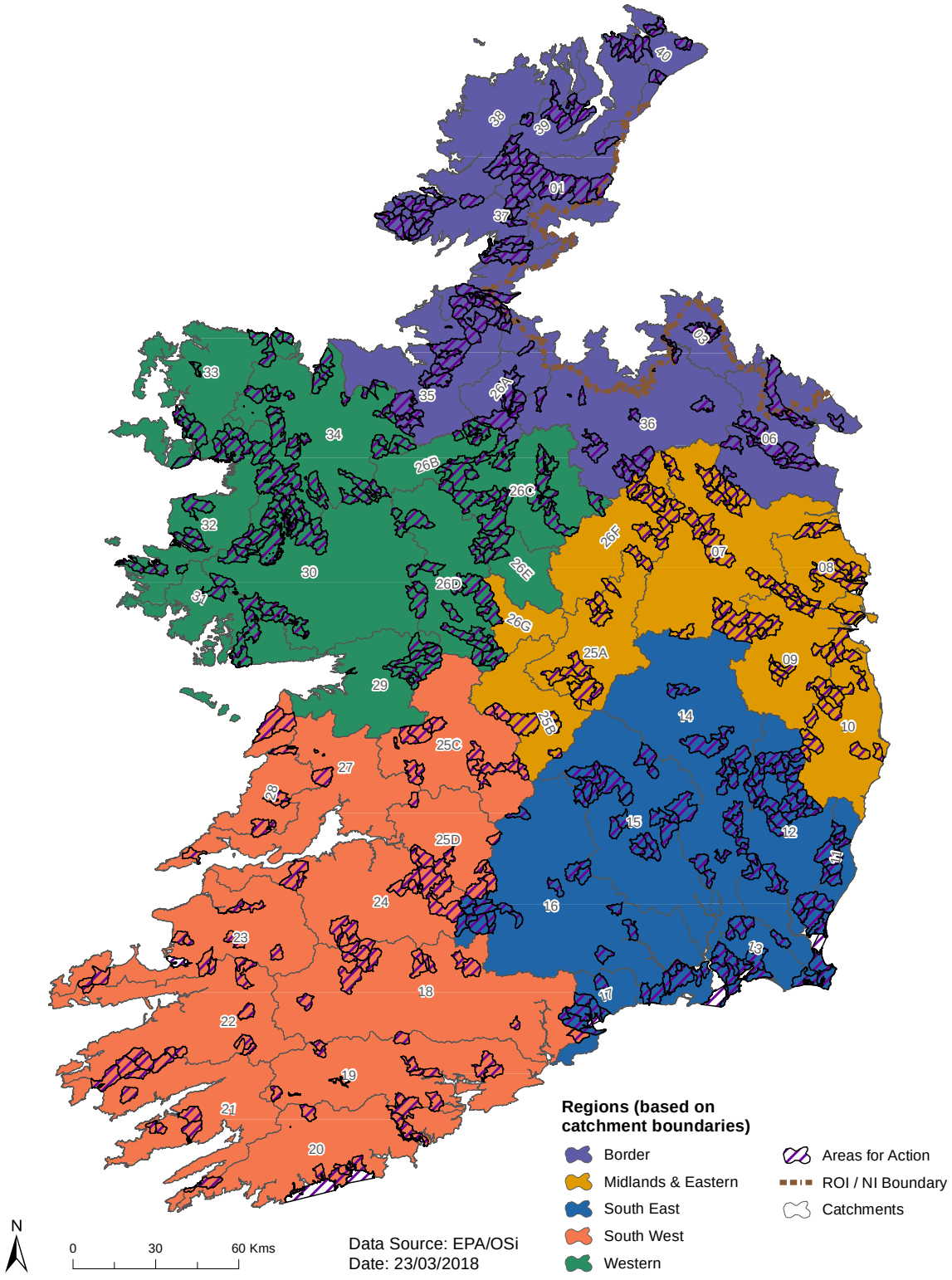
As described in Section 10, the local authority catchment assessment teams will drive the implementation of mitigation measures in the Areas for Action. Actions will be mainly directed towards pressures from agriculture, urban waste-water, domestic waste-water and forestry. The teams will have a number of resources and a suite of mitigation measures available from which they can select appropriate resources or measures for use at the local water-body scale. Through the RBMP governance and coordination structures, a number of working arrangements and protocols for dealing with sectoral issues have been agreed for dealing with the main issues that are expected to be encountered at local level. Where other issues are identified for which no suitable corrective or mitigation measure is currently available, these issues will be referred up through the RBMP governance structures for resolution at the appropriate level. Where there are clear, existing policy conflicts between water policy and policies relating primarily to other matters, such as agriculture or land use, these conflicts will be referred to the Water Policy Advisory Committee (WPAC), with recommendations for resolution.

While particular emphasis is being put on driving collaborative and cross-sectoral actions to deliver water-quality improvements in the Areas for Action, a number of existing and new measures will continue to be applied widely across the State extending beyond the Areas for Action. These include implementation of:

- The new strengthened Nitrates Action Programme (2018-2021)
- The Dairy Sustainability Initiative
- The Green, Low Carbon, Agri-Environmental Scheme (GLAS) and Targeted Agricultural Modernisation Scheme (TAMS) under the Rural Development Programme
- Irish Water's Capital Investment Programme responding to the requirements of the Urban Waste Water Treatment Directive, the Drinking Water Directive and the objectives established in River Basin Management Plans
- Mitigation measures contained in the OPW drainage maintenance programme
- Forestry policies and legislation as well as the promotion of forestry schemes to mitigate pollutant inputs to waters

In more general terms, the establishment of new implementation structures (see Section 10) and new structures for public and stakeholder engagement (see Section 11) will be critical to supporting effective implementation of measures at both the national and local levels. Measures proposed in this plan to develop an understanding and improved management of physical pressures on surface water (e.g. barriers to fish migration and siltation of river beds) during cycle 2 will

be essential to underpinning the development of effective regulatory controls and mitigation measures for a range of activities impacting on the physical conditions of surface waters. These regulatory controls and mitigation measures will be implemented during cycle 3 (2022–2027). In addition, the planned publication of guidance on physical planning and the WFD in 2019 will contribute to protecting waters from deterioration arising from future inappropriate development.



Map 13.1 - Areas for Action (190) in the five regions based on catchment boundaries

Region	Number Areas for Action (AAs)	Total number of Water Bodies in the AAs	Rivers	Lakes	Estuaries	Coasts
Midlands and Eastern	29	95	93	2	0	0
South West	59	132	111	9	9	3
Western	34	190	143	45	1	1
South east	34	150	141	2	4	3
Border	34	159	128	31	0	0
Total	190	726	616	89	14	7

Table 13.1 - Surface water-body types that have been selected for action

13.1 Key Policy Responses and Their Expected Outcomes

The measures proposed in this plan are expected to contribute significantly to the protection and improvement of water bodies nationally over this and future RBMPs. These include the following:

Agriculture

The new strengthened Nitrates Action Programme will continue to be enforced by local authorities and the Department of Agriculture, Food and the Marine (DAFM) through the national inspection programme. Up to 5,000 farmers will receive support from Teagasc through the new collaborative Sustainability Support and Advisory Programme targeted within the 190 Areas for Action. In addition, 18,000 dairy farmers will receive advice on sustainable farming practices under the Dairy Sustainability Initiative. As part of the RDP, 50,000 farmers are participating in GLAS, and 27,000 farmers will receive training in best environmental practices.

Urban Waste-Water

Irish Water's Capital Investment Programme will deliver 255 major waste-water treatment projects and collection systems in 41 areas, which will benefit 136 water bodies at risk from urban waste-water pressures. Many other water bodies will benefit from improved plant performance resulting from process optimisation and minor works.

Domestic Waste-Water

The next National Inspection Plan for Domestic Water Treatment Systems (2018–2021) will drive improvements in system maintenance. At least 1,000 inspections per year will be carried out by local authorities. Homeowners can avail of a grant for the repair of defective systems. To-date, 15% of all systems have failed due to structural problems. In addition an information campaign promoting best practice in system maintenance will be driven nationally by the Environmental Protection Agency (EPA) and locally by the Local Authority Waters and Communities Office (LAWCO).

Peat Extraction

Bord Na Móna expects to rehabilitate 9,000 ha. of cutaway bogs (covering 25 peatlands) by 2021. This is subject to several assumptions, including the availability of cutaway bogs for rehabilitation. Of these bogs, 11 are associated with 12 water bodies *At Risk* of not achieving their WFD objectives due in part to activities associated with peat extraction. Taking account of the length of time that must elapse before the natural recovery of the ecosystems is complete, 11 of these water bodies are expected to achieve their objectives by 2027.

13.2 Expected Environmental Outcomes

The risk characterisation identified 1,460 out of a total of 4,829 water bodies that are *At Risk* of not meeting their environmental objectives. These include all groundwater, river, lake, coastal and transitional waters.

Taking into account the likely impact of all of the measures described in this plan, a conservative estimate has been made of the number of water bodies in the 190 Areas for Action (726 water bodies) that are likely to achieve their environmental objectives by 2021, by 2027 or by a later date (Table 13.2).

Region	Total	Dates by which the Prioritised Water Bodies are Expected to Meet Their Environmental Objectives		
		2021	2027	Beyond 2027
Midlands/Eastern	95	30	52	13
South West	132	20	108	2
Western	190	32	149	8
South East	150	29	119	1
Border	159	41	114	3
Total	726	152	542	27

Table 13.2 - Priority Areas for Action targeted in this River Basin Management Plan

Expected Outcomes

255	Urban waste-water treatment projects progressed
€73m	Invested to reduce water leakage by 61million m^3 *per annum*. Reduce leakage from 45% - 38%
30	Sustainability advisors in place to deliver the Agricultural Sustainability Support and Advisory Programme
43	Technical personnel deployed to regionally-based Local Authorities Water Support and Advisory Teams
23,000	Farmers will receive sustainability advice under the Dairy Sustainability Initiative and the Agricultural Sustainability Support and Advisory Programme
4,000	Inspections under the National Inspection Plan for Domestic Waste Water Treatment Systems
3,000+	Water abstractions registered and an authorisation system implemented
	Guidance for planning authorities on physical planning and the Water Framework Directive
726	Water bodies to achieve general water quality improvements
152	Water bodies to experience improved water quality status

13.3 Summary of Expected Outcomes

Based on the information set out in the Plan, it is expected that the following will be achieved over the period to 2021:

- Investment in urban waste-water collection and treatment will deliver 255 waste-water treatment projects in urban areas, achieving water-quality improvements and compliance with the requirements of the Urban Waste Water Treatment Directive. Drainage-area plans will be prepared for 44 urban areas.
- 353 public drinking-water source risk assessments will be prepared. Measures will be taken to address 53 water supplies with pesticide exceedances.
- Irish Water will aim to achieve sustainable and efficient use of water by addressing (1) the high level of network leakage and unaccounted-for water (45% of all water entering the supply network), and (2) the very high level of water use at the top end of the domestic-usage range. Each year up to 2021, €73 million will be invested to reduce water leakage by 61 million m^3 *per annum*. This will reduce the leakage rate from 45% down to 38% (based on 2017 figures) by 2021.
- A new legislative framework for the sustainable management of water abstractions, which will include a requirement for the licensing of larger abstractions, will be established by early 2019. A register of water abstractions will be established in early 2018.
- The new strengthened Nitrates Action Programme (NAP) will continue to provide a good environmental baseline for the agriculture sector. Farm inspections of up to 6,000 *per annum* will be carried out by local authorities and the DAFM.
- The new Sustainability Support and Advisory Programme will be jointly resourced by the DAFM, the Dairy Cooperatives and the Department of Housing, Planning and Local Government. It will consist of 30 sustainability advisers, 20 based within Teagasc and 10 within the Dairy Cooperatives.
- An increased focus on knowledge transfer aimed at driving behavioural change towards more sustainable farming practices will see up to 5,000 farmers receiving support from Teagasc through the new collaborative Sustainability Support and Advisory Programme targeted within the 190 Areas for Action. In addition, 18,000 dairy farmers will receive advice on sustainable farming practices under the Dairy Sustainability Initiative.
- The National Inspection Plan for Domestic Water Treatment Systems (2018–2021) will drive improvements in the performance of systems, with over 4,000 inspections being carried out by local authorities over this period.
- Bord Na Móna is in the process of phasing out the extraction of peat for energy production by 2030. It expects to rehabilitate 9,000 ha. of cutaway bogs (covering 25 peatlands) by 2021 and will look to implement best-available mitigation measures to further reduce water-quality impacts caused by peat extraction while the phase-out is taking place.
- The delivery of guidance for planning authorities on physical planning and the WFD will contribute to the protection of waters from deterioration arising from inappropriate future development. Supporting technical guidance will also ensure that best environmental practice is applied where alterations to surface waters are undertaken. The OPW will continue to apply best practice when drainage maintenance works are carried out. Between 2018 and 2021, 8,000km of river channel will be maintained.
- In addition to the new LAWCO, regionally-based Local Authority Water Support and Advisory teams will be put in place. This will initially consist of a total of an additional 43 personnel, who will be involved in co-ordinating and promoting mitigation measures in the 190 Areas for Action.
- A Community Water Development Fund will be established to support local community water initiatives, with a particular focus on measures that are aligned with the priority actions in this Plan. The fund will be administered by LAWCO.
- A total of 190 Areas for Action have been prioritised nationally for particular attention during this cycle (2018–2021). These include a total of 726 water bodies. Actions will involve multidisciplinary and cross-agency approaches.

- The interactions between the new water governance structures — the five regional committees, the National Coordination and Management Committee, the National, Technical Implementation Group, the Water Forum (An Fóram Uisce) and the Water Policy Advisory Committee — will be critical to the effective implementation of this plan.
- On the basis of the above actions, it is expected to achieve general water-quality improvements in the 726 water bodies prioritised for this planning cycle (2018–2021). However, given the complexities involved and the known difficulty in achieving status improvements due to time lags in natural recovery and the interaction between multiple environmental pressure on water bodies, it is conservatively estimated that the actions outlined above will likely result in some 152 additional water bodies showing improvements in status by 2021 with further improvements thereafter.
- The *At Risk* water bodies that fall outside the 190 Areas for Action will still benefit from existing and newly introduced measures. As resources allow, these water bodies will be targeted for investigative assessments and further action, where necessary, through the prioritisation processes at regional committee level.

Appendix 1 Scheduled Waste-Water Treatment Plant Upgrades

Table 1 **Upgrades Being Undertaken to Support Compliance with the Requirements of the Urban Waste Water Treatment Directive**

Urban Area	Generated Load 2016 Population Equivalent (PE)	County	Completion Date
Ardee	6,492	Louth	2019
Arklow	16,261	Wicklow	2022
Athenry	6,624	Galway	2020
Ballybofey / Stranorlar	6,309	Donegal	2019
Claremorris	5,801	Mayo	2023
Cobh	14,990	Cork	2019
Collooney	2,064	Sligo	2021
Cork City	306,667	Cork City	2019
Drogheda	70,895	Louth	2018
Dundalk	79,001	Louth	2018
Ennis North	27,038	Clare	Works Complete
Enniscorthy	15,085	Wexford	2019
Ferns	2,035	Wexford	2023
Kells	8,375	Meath	Works Complete
Killybegs	12,371	Donegal	2018
Lahinch	2,644	Clare	2023
Lifford	2,194	Donegal	2021
Manorhamilton	2,692	Leitrim	2019
Mitchelstown	5,398	Cork	2021
Monksland	10,302	Roscommon	2019
Oughterard	2,092	Galway	2018
Passage-Monkstown	7,677	Cork	2018
Portarlington	12,159	Laois	Works Complete
Portlaw	2,150	Waterford	2019

Table 1 (cont'd): **Upgrades Being Undertaken to Support Compliance with the Requirements of the Urban Waste Water Treatment Directive**			
Urban Area	**Generated Load 2016 Population Equivalent (PE)**	**County**	**Completion Date**
Ringaskiddy-Crosshaven-Carrigaline	23,588	Cork	Works Complete
Ringsend	2,225,120	Dublin City	2021
Shannon	17,990	Clare	2020
Stamullen	4,294	Meath	2023
Tralee	36,386	Kerry	2018
Tubbercurry	3,095	Sligo	2019
Tullow	6,704	Carlow	2021
Youghal	15,522	Cork	2018

Table 2 **Upgrades Being Undertaken to Support Compliance with the Requirements of Protected Areas**				
Urban Area	**Protected Area**	**Generated Load 2016 Population Equivalent (PE)**	**County**	**Completion Date**
Clifden	Clifden Beach bathing area	3,431	Galway	2015
Galway	Ballyloughane Beach bathing area	107,963	Galway	2016
Rush	Rush South bathing area	7,800	Fingal	2018
Balbriggan	Loughshinny Beach bathing area	41,722	Fingal	2019
Ringsend	Merrion Strand bathing area	2,225,120	Dublin	2021
Oughterard	Corrib - Owenriff Freshwater Pearl Mussel area	2,092	Galway	2018

Table 3	Upgrades Being Undertaken to Support the Protection of High-Status Waters			
Urban Area	**High-Status Water**	**Generated Load 2016 Population Equivalent (PE)**	**County**	**Completion Date**
Ballyclough	Blackwater (Munster)	257	Cork	2017
Ballymakeera	Sullane	799	Cork	2021
Dripsey	Dripsey	450	Cork	2021
Kilgarvan	Roughty	<500	Kerry	2017
Newport (Mayo)	Newport Bay	1,375	Mayo	2023
Oughterard	Owenriff (Corrib)	2,092	Galway	2018
Ramelton	Carn Low	1,658	Donegal	2021
Strandhill	Sligo Bay	2,584	Sligo	2020

Table 4	Other Scheduled Waste-Water Treatment Plant Upgrades		
Urban Area	**Generated Load 2016 Population Equivalent (PE)**	**County**	**Completion Date**
Abbeyleix	2,770	Laois	Complete
Ahascragh	<500	Galway	2021
Ardfert	1,273	Kerry	2018
Ardmore	1,225	Waterford	Complete
Arthurstown	<500	Wexford	2021
Arvagh	569	Cavan	Complete
Askeaton	1,690	Limerick	2021
Athea	551	Limerick	2019
Athlone	24,789	Westmeath	2018
Aughrim	2,092	Wicklow	Complete
Avoca	850	Wicklow	2025
Bailieborough	3,326	Cavan	2024
Balla	1,000	Mayo	2018
Ballaghaderreen	1,993	Roscommon	2023
Ballina	5,898	Tipperary	2024
Ballinacarrow	<500	Sligo	2023
Ballinagh	1,176	Cavan	2018
Ballinakill	636	Laois	2018

Table 4 (cont'd): **Other Scheduled Waste-Water Treatment Plant Upgrades**			
Urban Area	**Generated Load 2016 Population Equivalent (PE)**	**County**	**Completion Date**
Ballinamore	1,794	Leitrim	Complete
Ballingeary	615	Cork	2022
Ballinroad	-	Waterford	Complete
Ballinrobe	4,518	Mayo	2023
Ballintra	<500	Donegal	2021
Ballivor	2,376	Meath	Complete
Ballyclough	257	Cork	Complete
Ballycotton	963	Cork	2021
Ballygar	857	Galway	2020
Ballyhack	<500	Wexford	2021
Ballyhaunis	3,674	Mayo	2024
Ballyjamesduff	3,682	Cavan	2024
Ballyliffin	891	Donegal	2023
Ballylinan	1,476	Laois	2018
Ballylongford	680	Kerry	Complete
Ballymore	591	Westmeath	2018
Ballymore Eustace	901	Kildare	Complete
Ballymote	2,785	Sligo	Complete
Ballymurn and environs	661	Wexford	Complete
Ballyvaughan	648	Clare	2021
Baltinglass	3,466	Wicklow	2023
Banagher	2,561	Offaly	2020
Bandon	9,801	Cork	2022
Bangor Erris	629	Mayo	Complete
Bantry	5,298	Cork	2023
Belcarra	365	Mayo	Complete
Belmullet	1,909	Mayo	2018
Blessington	6,099	Wicklow	2021
Boherbue	768	Cork	2023
Bridgend	763	Donegal	2024
Buncrana	10,513	Donegal	2025
Bundoran	6,510	Donegal	2018
Burnfoot	517	Donegal	2024

Table 4 (cont'd): **Other Scheduled Waste-Water Treatment Plant Upgrades**

Urban Area	Generated Load 2016 Population Equivalent (PE)	County	Completion Date
Burtonport	<500	Donegal	2021
Cahir	5,316	Tipperary	2023
Cappoquin	1,530	Waterford	Complete
Carlow Town	31,841	Carlow	2023
Carraroe	944	Galway	2021
Carrickmacross	9,455	Monaghan	2020
Carrigallen	<500	Leitrim	2019
Carrigart	506	Donegal	2022
Carrigtohill	14,113	Cork	Complete
Cashel	13,089	Tipperary	2024
Castleblayney	6,722	Monaghan	2019
Castlecomer	2,129	Kilkenny	Complete
Castlefinn	1,199	Donegal	2021
Castleisland	4,033	Kerry	2023
Castlemaine	<500	Kerry	2024
Castlemartyr	1,884	Cork	2024
Castletown	465	Laois	2018
Castletownbere	1,967	Cork	2021
Castletownsend	575	Cork	2021
Castletroy	39,872	Limerick	2024
Cavan Town	17,775	Cavan	Complete
Charlestown	1,714	Mayo	2020
Charleville and Environs	4,758	Cork	2024
Cheekpoint	<500	Waterford	Complete
Clarecastle	1,368	Clare	2021
Claregalway	2,706	Galway	Complete
Cliffoney	697	Sligo	Complete
Clogherhead	2,707	Louth	2024
Clondulane	508	Cork	2018
Clonroche	604	Wexford	Complete
Coachford	756	Cork	2021
CoillDubh	1,380	Kildare	Complete
Convoy	1,961	Donegal	2018

Table 4 (cont'd): **Other Scheduled Waste-Water Treatment Plant Upgrades**			
Urban Area	**Generated Load 2016 Population Equivalent (PE)**	**County**	**Completion Date**
Cootehill	3,275	Cavan	2024
Courtmacsherry and Timoleague	1,450	Cork	2020
Courtown-Gorey	18,778	Wexford	Complete
Cross	<500	Mayo	Complete
Drimoleague	720	Cork	2021
Dromahane	1,032	Cork	Complete
Dromcollagher Town and Environs	912	Limerick	2021
Drumconrath	509	Meath	2018
Drumshanbo	2,304	Leitrim	2022
Duncannon	1,073	Wexford	2021
Dunfanaghy	2,353	Donegal	2024
Dungloe	2,454	Donegal	Complete
Dunlavin	1,395	Wicklow	Complete
Dunmanway	2,664	Cork	Complete
Dunmore East	3,564	Waterford	Complete
Dunshaughlin	6,848	Meath	2023
Durrow	1,264	Laois	Complete
Enfield	4,583	Meath	2024
Enniskerry and environs	2,977	Wicklow	2018
Ennistymon WWTP	1,391	Clare	2021
Eyrecourt	<500	Galway	2023
Fahan	1,076	Donegal	2024
Falcarragh	1,668	Donegal	2020
Fethard	2,756	Tipperary	2024
Fetherd-on-Sea	674	Wexford	2021
Foxford	2,804	Mayo	2020
Foynes	1,474	Limerick	2023
Freshford	817	Kilkenny	Complete
Glenamaddy	661	Galway	2020
Glenties	572	Donegal	Complete
Glin	935	Limerick	2023
Goresbridge	496	Kilkenny	Complete

Table 4 (cont'd): **Other Scheduled Waste-Water Treatment Plant Upgrades**

Urban Area	Generated Load 2016 Population Equivalent (PE)	County	Completion Date
Grange	864	Sligo	2020
Greencastle Housing Scheme	90	Donegal	2019
Gweedore	-	Donegal	2021
Hacketstown	974	Carlow	Complete
Inchigeelagh	<500	Cork	2021
Inistioge	<500	Kilkenny	2020
Innishannon	1,015	Cork	2021
Johnstown	659	Kilkenny	Complete
Kanturk	3,588	Cork	2024
Kenmare	6,991	Kerry	2023
Kentstown	1,436	Meath	2019
Kerrykeel	<500	Donegal	2021
Kilcar	1,230	Donegal	2021
Kilcoole	2,524	Wicklow	Complete
Kilcummin	-	Kerry	2024
Kildorrery	461	Cork	Complete
Kilfenora	<500	Clare	2021
Kilkee	4,000	Clare	2021
Killala	1,003	Mayo	2019
Killavullen and Environs	418	Cork	Complete
Killea	709	Donegal	2021
Kilmacrennan	952	Donegal	2022
Kilmacthomas	1,401	Waterford	Complete
Kilmallock	2,619	Limerick	Complete
Kilmeague	1,846	Kildare	Complete
Kilmihil	<500	Clare	2021
Kilmore Quay	4,260	Wexford	2021
Kilpedder	637	Wicklow	Complete
Kilrush WWTP	4,680	Clare	2021
Kingscourt	3,313	Cavan	2024
Kinnegad	3,540	Westmeath	Complete
Kinvara	812	Galway	Complete
Knightstown	816	Kerry	Complete

Table 4 (cont'd): **Other Scheduled Waste-Water Treatment Plant Upgrades**			
Urban Area	**Generated Load 2016 Population Equivalent (PE)**	**County**	**Completion Date**
Lahardane	297	Mayo	Complete
Leitrim Villlage	1,203	Leitrim	2019
Limerick	116,953	Limerick	2024
Liscannor WWTP	414	Clare	2021
Lismore	2,509	Waterford	Complete
Leixlip	130,084	Kildare	Complete
Macroom	5,570	Cork	2024
Mallow	15,863	Cork	2021
Midleton	18,424	Cork	Complete
Milford	2,042	Donegal	2021
Millstreet	3,163	Cork	2021
Milltown	<500	Galway	Complete
Mohill	1,635	Leitrim	2019
Mountbellew	1,477	Galway	2021
Mountmellick	6,194	Laois	2023
Mountrath	2,676	Laois	Complete
Moville	1,753	Donegal	2021
Muff	-	Donegal	2023
Muinebheag and Leighlinbridge	12,430	Carlow	2024
Mullaghmore	717	Sligo	2024
Mullinahone	602	Tipperary	2019
Mullinavat	<500	Kilkenny	2020
Navan	37,680	Meath	2024
Nenagh	14,648	Tipperary	2020
Newcastle	1,360	Wicklow	2018
Newmarket	1,322	Cork	2024
Newmarket-on-Fergus	1,732	Clare	2024
Newport	2,792	Tipperary	2024
Nobber	767	Meath	Complete
Oldcastle	2,090	Meath	Complete
Omeath	<500	Louth	2021
Passage East	<500	Waterford	2023
Portlaoise	29,579	Laois	2024
Portumna	2,775	Galway	2023

Table 4 (cont'd): **Other Scheduled Waste-Water Treatment Plant Upgrades**			
Urban Area	**Generated Load 2016 Population Equivalent (PE)**	**County**	**Completion Date**
Quin WWTP	1,154	Clare	2021
Raphoe	2,102	Donegal	2021
Rathdowney	1,946	Laois	Complete
Rathmullan	1,388	Donegal	2021
Rathvilly Wastewater Treatment Plant	1,321	Carlow	Complete
Redcross	732	Wicklow	Complete
Rhode	1,023	Offaly	Complete
Ringaskiddy Village	1,996	Cork	Complete
Riverstick	842	Cork	Complete
Rosscarbery/Owenahincha	4,183	Cork	2023
Rosses Point	1,679	Sligo	2024
Roundstone	<500	Galway	2021
Saleen	<500	Cork	2025
Schull	1,708	Cork	Complete
Shannon Town WWTP	17,990	Clare	2020
Spiddal	165	Galway	2021
St Johnston	469	Donegal	Complete
Stonyford	<500	Kilkenny	Complete
Stradbally	711	Waterford	Complete
Stradbally Agglomeration	1,768	Laois	Complete
Swords	56,924	Dublin	Complete
Taghmon	-	Wexford	Complete
Tallow	1,548	Waterford	Complete
Tarbert	1,100	Kerry	Complete
Tinahely	1,365	Wicklow	Complete
Tipperary Town	16,528	Tipperary	2024
Trim	11,948	Meath	2023
Tuam	21,442	Galway	2019
Osberstown	90,810	Kildare	Complete
Urlingford	1,394	Kilkenny	Complete
Virginia	3,988	Cavan	2024
Whitegate/Aghada	2,805	Cork	2021
Woodford	<500	Galway	2021

Appendix 2 - Prioritised Areas for Action

Region	Areas for Action*	Local Authority
Border	River Finn	Donegal
	St Johnstons	Donegal
	Donegal SW & Murlins	Donegal
	Laghy Stream - Bridgetown	Donegal
	Lough Eske	Donegal
	Glen Lackagh	Donegal
	Leannan	Donegal
	Roosky	Donegal
	Donagh	Donegal
	Mountain (water) &Emy Lake	Monaghan
	Glyde-Proules	Monaghan/Louth
	Kilmainham (Dee)	Meath
	Castletown	Louth
	Big River (Louth)	Louth
	Lough Allen	Leitrim
	Maghery	Monaghan
	Duff	Leitrim/Sligo
	Erne	Cavan
	Avaghon	Monaghan
	Cullies	Cavan/Leitrim
	Kilroosky Lough Cluster	Monaghan
	Lough Melvin and Drowse	Leitrim
	Templeport	Cavan
	Roo	Cavan
	Yellow (Ballinamore)	Leitrim
	Annalee	Cavan
	Clonmany	Donegal
	Malin	Donegal
	Lough Nastackan	Donegal
	Unshin	Sligo
	Owenmore/ Templehouse lake	Sligo
	Upper Bonet	Leitrim
	Lough Gill	Leitrim/Sligo
	Glencar lake	Leitrim/Sligo

*Further details for Areas for Action are available on watersandcommunities.ie and catchments.ie

Region	Areas for Action*	Local Authority
Western	Dawros	Galway
	St Clerans stream	Galway
	Radford	Galway
	Owenriff	Galway
	Failmore	Galway
	Recess	Galway
	Cashla	Galway
	Island	Galway
	Castlegar	Galway
	Suck	Galway
	Ballinure	Galway
	Killukin/ Shannon	Leitrim
	Lough Rinn/Forbes	Leitrim/Longford
	Camlin	Longford
	Carrowmore	Mayo
	Ballinglen	Mayo
	Bundorragh	Mayo
	Nephin Beg/ Owengarve	Mayo
	LouisburghBunowen	Mayo
	Newport	Mayo
	Lough Mask and Carra	Mayo
	Glenree	Mayo/Sligo
	Owengarve Charleston	Mayo/Sligo
	Cloonlavis/Glore	Mayo
	Lough Conn and Lough Cullin	Mayo
	Castlebar/Lannagh	Mayo
	Upper and Lower Deel	Mayo
	Carricknabraher	Roscommon
	Tulsk	Roscommon
	Jiggy/Hind	Roscommon
	Cloooneigh	Roscommon
	Lough Key	Roscommon
	Tubbercurry	Sligo
	Bellawaddy	Sligo

*Further details for Areas for Action are available on watersandcommunities.ie and catchments.ie

Region	Areas for Action*	Local Authority
Midlands and Eastern	Moynalty	Meath/Cavan
	Lough Lene/Adeel Stream	Westmeath
	Boycetown	Meath
	Athboy	Meath
	Nadreegeel	Cavan
	Blackwater/Longwood	Kildare/Meath
	Sheelin (with Inny)	Meath/Cavan/Westmeath
	Derravaragh/Yellow River	Westmeath
	Lough Ennell/Dysart Stream	Westmeath
	Gageborough	Westmeath/Offaly
	Boora	Offaly
	Silver (Kilcormac)	Offaly
	Clareen	Offaly
	Little Brosna	Offaly/Tipperary
	Dodder	Dublin City/Dún Laoghaire-Rathdown/South Dublin
	Morell	Kildare
	Clonshanbo/Lyreen	Kildare
	Santry/Mayne Rivers	Dublin City/Fingal
	Upper Tolka	Dublin City/Meath/Fingal
	Rogerstown Estuary	Fingal
	Lower Nanny	Meath
	Ashbourne	Meath
	Ow	Wicklow
	Potters and Three Mile Water	Wicklow
	Dargle and Carrickmines	Wicklow/Dún Laoghaire-Rathdown/ South Dublin
	Liffey Upper	Wicklow
	Avonbeg-Avonmore	Wicklow
	Bunow	Tipperary/Laois/Offaly

*Further details for Areas for Action are available on watersandcommunities.ie and catchments.ie

Region	Areas for Action*	Local Authority
South East	Burren	Carlow
	Mountain	Carlow
	Graney-Lerr	Kildare/Carlow
	Athy stream	Kildare/Laois
	Brownstown (Pococke)	Kilkenny
	Duiske	Kilkenny
	Breagagh (Kilkenny)	Kilkenny
	Dinin (south, main and muckalee)	Kilkenny/Carlow
	Nuenna	Kilkenny/Laois
	Erkina	Laois
	Owveg (Nore)	Laois
	Ballyroan	Laois
	Portarlington area	Laois/Kildare/Offaly
	Ara	Tipperary
	Borrisoleigh	Tipperary
	Clashawley	Tipperary
	Lingaun	Tipperary
	Aherlow	Tipperary/Limerick
	Clodiagh (Portlaw)	Waterford
	Johns	Waterford
	Tay	Waterford
	Colligan-Bricky-Dungarvan Harbour	Waterford
	Dunhill	Waterford
	Sow	Wexford
	Wexford coastal lagoons	Wexford
	Owenavorragh	Wexford
	Urrin	Wexford
	Wexford Harbour	Wexford
	Blackwater (Wexford)	Wexford
	Bannow	Wexford
	Waterford Harbour	Wexford
	Slaney	Wicklow/Carlow
	Derreen and Douglas (Kiltegan)	Wicklow/Carlow
	Derry-Coolboy-Rosnastraw	Wicklow/Carlow

*Further details for Areas for Action are available on watersandcommunities.ie and catchments.ie

Region	Areas for Action*	Local Authority
South West	Doonbeg System	Clare
	Lickeen System	Clare
	Doo Lough and Annageeragh	Clare
	Aille (Clare)	Clare
	Lower Graney	Clare
	Inchiquin&Atedaun Lakes	Clare
	Shallee	Clare
	Carrigaholt	Clare
	Broadford	Clare
	Bleach & Lough Graney	Clare/Galway
	Owentaraglin	Cork
	Allow	Cork
	Ogeen	Cork
	Farahy	Cork
	Upper Funshion	Cork
	Awbeg (Buttevant) West	Cork
	Kilkeran Lagoon	Cork
	Clonakilty	Cork
	Bandon estuary	Cork
	Caha	Cork
	Rosscarbery	Cork
	Allua	Cork
	Owenboy	Cork
	Martin	Cork
	Bride (Cork city)	Cork City
	Keel Foherish	Cork
	Carrigdrohid	Cork
	Middleton	Cork
	Glan	Cork
	Lough Fadda/Ownagappul	Cork
	Adrigole	Cork
	Woodford	Galway
	Upper Caragh	Kerry
	Milltown (Kerry)	Kerry
	Fahaduff and Upper Maine	Kerry

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Region	Areas for Action*	Local Authority
South West contd.	Deenagh	Kerry
	Finow	Kerry
	Owenshagh	Kerry
	Lough Currane	Kerry
	Inny	Kerry
	Owenmore	Kerry
	Lee (Tralee) & Estuary	Kerry
	Feale	Kerry
	Tyshe	Kerry
	Lough Gur	Limerick
	Camoge	Limerick
	Owvane	Limerick
	Drumcomoge	Limerick
	Groody	Limerick
	Mulkear (Limerick)	Limerick
	Upper Deel	Limerick/Cork
	Toem and Cappawhite	Tipperary
	Inch (Bilboa)	Tipperary
	Dead and Cauteen	Tipperary
	Lower Nenagh and Clareen	Tipperary
	Ballyfinboy (Upper)	Tipperary/Offaly
	Lorrha Stream	Tipperary
	Glenaboy	Waterford
	Licky	Waterford

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