



EU Water Framework Directive–River Basin Management Planning in Ireland

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Abstract

The European Union (EU) Water Framework Directive (WFD) (2000/60/EC) was transposed into Irish law by Statutory Instrument Nos. 722 of 2003, 413 of 2005 and 218 of 2009, which set out a new strategy and process to protect and enhance Ireland's water resources and water-dependent ecosystems. The Directive requires a novel, holistic, integrated, and iterative process to address Ireland's natural waters based on a series of six-year planning cycles. Key success factors in implementing the Directive include an in-depth and balanced treatment of the ecological, economic, institutional and cultural aspects of river basin management planning. Introducing this visionary discipline for the management of sustainable water resources requires a solemn commitment to a new mindset and an overarching monitoring and management regime which hitherto has never been attempted in Ireland. The WFD must be implemented in conjunction with a myriad of complimentary directives and associated legislation, addressing such key related topics as flood/drought management, biodiversity protection, land use planning, and water/wastewater and diffuse pollution engineering and regulation. The critical steps identified for river basin management planning under the WFD include: 1) characterization and classification of water bodies (i.e., how healthy are Irish waters?), 2) definition of significant water pressures (e.g., agriculture, forestry, septic tanks), 3) enhancement of measures for designated protected areas, 4) establishment of objectives for all surface and ground waters, and 5) integrating these critical steps into a comprehensive and coherent river basin management plan and associated programme of measures. A parallel WFD implementation programme critically depends on an effective environmental management system (EMS) approach with a plan-do-check-act cycle applied to each of the evolving six-year plans. The proactive involvement of stakeholders and the general public is a key element of this EMS approach.

Keywords: Water Framework Directive, River basin management planning, Environmental management system

1. Introduction

In the 1970s, the first directives aimed at protecting water resources were introduced in Europe. Since then measures have been taken to ensure the quality of water resources by enforcing specific environmental quality standards initially and by targeting sectoral uses of water later. A third phase, involving the adoption of the Water Framework Directive, was slow and took around three years from original submission of the Commission proposal in February 1997 to final adoption of the text in October 2000. Among the issues of particular sensitivity to the Parliament were those of the legally binding nature of the obligations, the elimination of hazardous substances and the protection of groundwaters, as well as derogations and timetables. The issue of water pricing, a matter of particular concern for the Irish government, was only settled at the end of the negotiations. The EU WFD, adopted on 23 October 2000 (2000/60/EC), was introduced to align the large body of water legislation into one

overarching strategy. For successful protection of the aquatic environment, this involved the integration of various EU policies such as agriculture, hydropower and navigation, with water policy as a prerequisite. The EU's water policy comprises a large body of legislation with a focus on drinking water, groundwater, bathing water quality and urban wastewater. Today, the challenge prevails in tackling the pollution and addresses the over-exploitation of freshwater in agriculture, in industry and other human activities. According to Commission statistics:

- 20% of all surface water in the EU is seriously threatened by pollution,
- 60% of European cities overexploit their groundwater resources which supply around 65% of all drinking water in Europe,
- 50% of wetlands have "endangered status" due to groundwater overexploitation, and
- The area of irrigated land in Southern Europe has increased by 20% since 1985.

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The WFD imposes a general requirement for ecological protection and a minimum chemical standard for all surface waters. The key element of the Directive is that it introduces a model for water management based on ‘river basins,’ natural hydrometric or geographical areas, rather than on administrative or political boundaries. The Directive provides that, for each river basin, a “river basin management plan” should be established and updated every six years by competent national authorities. While river basin management plans require ecological and chemical protection everywhere as a minimum standard, specific zones with particular uses must be identified where higher objectives are to be met. In contrast, policies that may adversely affect water quality may be allowed on the basis of overriding policy objectives, such as flood protection and access to essential drinking water supplies.

By 2010, the Directive also requires member states to impose a water pricing policy in order to encourage consumers to use water resources more efficiently. Pricing policies are also meant to recover the costs of water services, including those relating to the environment and the use of resources. Although pricing policies are established in many EU states, others, including Ireland, have no tradition of water pricing. However, the Directive does allow for derogations in the case of less-favored areas or to provide basic services at an affordable price. Within this framework, public participation requires the proactive engagement of all interested parties for more transparent decision-making and there are already very good examples across Europe. There is also a need for stronger cooperation among different administrations (national, regional, local) as well as for international cooperation for sustainable water management.

2. Directive Requirements

“Water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such.” (From the first recital of the EU WFD) While the WFD is one of the most advanced frameworks globally for sustainable environmental management of resources, it is first necessary to concentrate locally to identify, characterize and forecast the potential impact on water bodies. Climate change induces or modifies trends and hazards and increases variability and uncertainty. However, climate change is not the only non-stationary factor; system changes such as land use also affect water resources.

Decision-making needs to take into account long-term infrastructure assets to address the issue of how to cope with increased water resource management uncertainty when deciding for example on investments. Furthermore, decisions should be made on how to assess the adaptation capacity of assets and how to design climate-proof assets. Partnerships for research need to be developed which are decision-support oriented, targeted and field specific. Networking needs to be encouraged between site-specific “experiments” to foster collective learning.

3. Implementation in Ireland

Ireland is a small island in an archipelago off the northwestern shore of the European mainland. The fact that Ireland is surrounded by sea influences the climate and the attitudes of its inhabitants towards many issues including water.

The Northern Ireland troubles are a reminder that we are no strangers to addressing transboundary issues and indeed the island status confers both advantages and disadvantages economically, environmentally and politically. Equally, however, our interdependency in the EU and globally has been brought home to many of us by our increasing knowledge of the processes of environmental change and of transboundary pollution via air and water. Irish institutions on which we have depended for decades are changing dramatically and with them the familiar face of the Irish countryside. Many Irish waters are still healthy and the first challenge is to take action to preserve their status. Nevertheless, there are also cases of waters choked with weeds and algae, and incidents of fish-kills or contaminated drinking waters.

Two main tasks need to be undertaken: 1) waters at high or good status should be managed to preserve their quality, and 2) water at poorer status should be managed to improve their quality. Quarrying and water abstractions are also trying to keep pace with hydrological requirements of the WFD, while environmental considerations track economic activity and water, and wastewater infrastructure tracks the planning and development process.

Pollution can arise from two types of source: 1) local point sources, for example pipes discharging effluents from industries, wastewater treatment plants, urban areas or mines, and 2) widespread diffuse pollution sources, such as land use activities like farming, forestry or septic tank installations.

4. Special Areas

Some areas require greater protection because they are home to rare and vulnerable habitats or wildlife. Other areas are sensitive because of their beneficial uses or the need to protect human health. They include drinking water sources, shellfish growing areas and bathing areas, where we must guard against bacteria, viruses and parasites.

The effect of physical modifications on waterways is of growing concern. Waters are modified by a) drainage of lands for development, agriculture, forestry or peat extraction, b) construction of river pluvial flood defenses and weirs to control river water levels, c) damming of lakes to provide storage for power generation or water supply, d) port developments, and e) construction of coastal defenses to prevent tidal flooding or erosion.

These engineered modifications can either directly remove habitat or indirectly change the natural structure or flow of waterways. This may mean a reduction in biodiversity, loss of rare or endangered habitats and species or depletion of valuable fish stocks.

5. Administration

The island of Ireland has been divided into eight river basin districts (RBDs) to help manage implementation of the Directive and a River Basin Management Plan (the “Plan”) has been developed for each RBD. A series of documents has been produced for implementing the Directive in Ireland. An important background report, known as “Water Matters,” was prepared by the relevant local authorities covering each RBD. It includes a preliminary overview of significant water management issues across each RBD and actions suggested to solve these problems,

in addition to inviting public comment. Amid all these changes and pressures, the EU WFD requires Ireland to protect and enhance its natural waters and achieve new enhanced standards by 2015

6. Directive Integration

The WFD establishes a picture of the water policy, setting the objective to be reached within a certain timetable but also promoting an integrated approach and highlighting the importance of linking ecological and socio-economic considerations when managing water resources. The implementation of the WFD depends on, a) the quality of the scientific/technical knowledge (ecological classification, economic assessment), b) the appropriate organizational and institutional arrangements, and c) the proper resourcing of measures. Public information and consultation is not only an obligation of WFD Article 14, it also provides useful information in the earlier stages of the decision-making process. Early involvement might also help in enhancing the feeling of ownership of a certain decision by all the stakeholders and the general public.

7. Thinking beyond the “Water Box”

Water management is affected by many other policies and needs to be coordinated with them. The WFD and its focus on river basin management plans is obviously one answer to these concerns. It is important to look at the impact of a number of other economic activities on water, and coordinate with a number of other sectors such as agricultural, municipal and industrial sectors.

In emerging issues in water management, climate change requires significant adaptation for a challenging water future. Climate change is expected to affect different regions of the EU differently, with the southern member states predicted to be affected more than the northern member states. Changes due to climate change such as changes in extreme events of floods and droughts, precipitation patterns and sea levels may be especially relevant to certain regions, and their effects will have implications across the EU. The drafting of the White Paper on Adapting to Climate Change (1 April 2009) highlighted that “Reducing greenhouse gas emissions is no longer the sole priority, and a complementary set of measures is needed to adjust to the already visible effects of climate change [1]. It is therefore necessary to concentrate on water management, because water stress will be one of the main consequences of climate change.

There are three major reasons why these actions must be coordinated at the European level: 1) the cross-border impact of climate change, particularly on river basins, 2) the existence of sectors, such as agriculture, aquaculture and fishing, which are regulated by common policies at the EU level, and 3) the principle of mutual solidarity between member states.

Changes can already be observed in the water cycle due to climate change. Heavy precipitation will increase in some areas and decrease in others. Climate change will probably increase the frequency and intensity of low-river flows, affecting both water quantity and water quality. Although the impact of climate change on water quantity is widely recognized, its impact on water quality is less known. However, water quality during droughts indicates a general deterioration with respect to wa-

ter temperature, eutrophication, major elements, and chemical pollutants.

This decline in water quality is primarily caused by favorable conditions for the development of algal blooms (high water temperatures, long residence times, high nutrient concentrations) and a reduction in the dilution capacity of point source effluents.

No model consensus has been reached on the magnitude of these regional changes, so the results of current assessments must be treated with caution. It remains difficult to translate large-scale predictions to local scale and it is required that WFD is used to integrate and develop a framework to assess the future vulnerability of water and its extremes to respond to future drivers of global change.

8. Water Security

The maintenance of water security in the light of changing global conditions is an important issue. To better understand the impact on water resources and to raise awareness and promote sustainable stewardship, water footprints are an important methodological tool that can be used at all levels. Producing goods and services generally requires water. The water used in the production process of an agricultural or industrial product is called the ‘virtual water’ contained in the product. The concept of ‘virtual water’ was introduced in the early nineties. It took nearly a decade to get global recognition of the importance of the concept for achieving regional and global water security. According to a recent study, the production of a 32-megabyte, 2-gram computer chip requires 32 kg of water, 1 kg of grain requires 1,000-2,000 kg (1-2 m³), 1 kg of cheese requires 5,000-5,500 kg and 1 kg of beef requires an average of 16,000 kg. Meat products require far more water than the equivalent food value of grains.

If one country exports a water-intensive product to another country, it exports water in virtual form. Some countries support others in their water needs via such exports. A recent water footprint study shows that the UK is only 38% self-sufficient in water sources and most of the water consumed is through virtual water trade. The UK is the 6th largest net importer of virtual water, with the highest contributions coming from West Africa and Latin America.

A study of the water footprint of Germany emphasizes how the developed world needs to care for developing world river basins supplying vast quantities of “virtual water” embedded in imported products and commodities. While German households use 124 liters of water a day directly, individual Germans use 5,288 liters of water a day when the water requirements for producing their food, clothes and other consumables are included. Germany’s water footprint is 159.5 cubic kilometers of water annually, with only half coming from German rain and rivers. The water embedded in coffee, soy and beef imports makes Brazil Germany’s largest water trading partner.

Water footprints are underlining just how dependant the developed world is on water from areas where water management is relatively poor. It is therefore good policy for wealthy nations to support the protection and better management of the river basins and aquifers of the developing world. More than a decade since an overwhelming majority of the world’s nations approved the UN Watercourses Convention, the agreement still lacks enough signatories to come into effect, although three quarters

of the world's countries share waters and 40% of world population are in border catchments. The Convention is intended to strengthen national measures for the protection and ecologically sound management of transboundary surface waters and groundwater. It obliges parties to prevent, control and reduce water pollution from point and non-point sources. It also includes provisions for monitoring, research and development, consultations, warning and alarm systems, mutual assistance, institutional arrangements, and the exchange and protection of information, as well as public access to information. In signing up to the Convention, other major economies could provide a global framework for minimizing the risks of disruption to the water supplies. The following countries have not ratified the Convention:

Abstention

Andorra, Argentina, Azerbaijan, Bolivia, Bulgaria, Colombia, Cuba, Ecuador, Egypt, Ethiopia, France, Ghana, Guatemala, India, Israel, Mali, Monaco, Mongolia, Pakistan, Panama, Paraguay, Peru, Rwanda, Spain, United, Republic of Tanzania, Uzbekistan.

Absent

Afghanistan, Dominican Republic, El Salvador, Eritrea, Guinea, Lebanon, Mauritania, Myanmar, Niger, Palau, Saint Kitts & Nevis, Saint Lucia, Saint Vincent and the Grenadines, Senegal, Solomon Islands, Sri Lanka, Swaziland, Tajikistan, The former Yugoslav, Republic of Macedonia, Turkmenistan, Uganda, Zaire, Zimbabwe.

Against

China, Turkey and Burundi

9. Challenges of Achieving the Objectives

The WFD provides an opportunity to enhance the water environment of Ireland and to improve its management through the implementation of river-basin management planning with stakeholder and public engagement and the delivery of a programme of environmental-improvement measures to deliver good ecological status. Whilst the Directive provides unparalleled opportunities, there are significant challenges to its successful implementation in Ireland, where a step-by-step change in the cultural mindset and managing the water environment will be required.

The primary challenge that Ireland faces is to achieve good water status for all waters by 2015. Not all waters in Ireland currently meet this good status objective. The main threat to surface water quality is eutrophication, which is the over-abundant growth of plant and algae arising from excessive nutrients in the water, particularly phosphorus and nitrogen from agricultural manures and fertilizers, sewage and detergents. The quality of public drinking water supplies remains high. However, the microbiological quality of the private group water schemes and groundwater continue to be challenges for those responsible for providing drinking water.

Overall, Irish rivers (70.2%) have a satisfactory water quality status and the level of serious pollution continues to be low (0.6%). Based on the most recent evaluation, 70.2% of river channel length should achieve the WFD good status target whereas significant efforts are required to improve the remaining 29.8%.

The majority (83.8%) of the 421 lakes assessed was of satisfactory water quality, i.e., oligotrophic or mesotrophic in status. Measures need to be put in place to improve the water quality of the remaining 68 lakes (16.2%) that do not have satisfactory water quality status as set out in the WFD. Of the 67 water bodies assessed from 20 estuarine and coastal areas, 40% were classified as unpolluted. Significant efforts are needed for the remaining estuarine and coastal water bodies to achieve the WFD good status target.

The quality of bathing waters is very good, with 97% of the bathing areas complying with the minimum EU mandatory standards and 90% with the more stringent EU guideline standards. An increasing number of groundwater samples show zero contamination. However, 52% of all Environmental Protection Agency (EPA) groundwater monitoring locations showed bacteriological contamination at least once between 2003 and 2005. The compliance of public water supplies with the microbiological parameter, *E. coli*, remained high at 98.9% in 2005, although the group water compliance rate continued to lag behind. The proportion of wastewater receiving secondary wastewater treatment increased from 21% in 2000-2001 to 82% in 2004-2005. The percentage of water bodies at risk of failing to meet the WFD good water targets by 2015 was identified as follows: rivers (64%), lakes (64%), estuarine waters (53%), coastal waters (27%) and groundwaters (62%).

10. River Basin Management

In Ireland there are 4 river RBDs wholly within the State: the Eastern, South Eastern, Western and South Western. The Shannon, Neagh-Bann and North Western RBDs are shared with Northern Ireland and are thus classified as International RBDs. The eighth RBD is entirely within Northern Ireland. In 2004, all RBDs in Ireland were characterized and analyzed as required by Article 5 of the WFD. In the characterization study the impact of a range of pressures was assessed, including diffuse and point pollution, water abstraction and morphological pressures (e.g. water regulation structures) in order to identify water bodies at risk of failing to meet the WFD objectives by 2015.

^aWhile a water body may be assessed as 'at risk,' that does not imply that it does not currently have good water quality status, but rather that there is a risk that it may deteriorate below this level.

11. Conclusions

A comprehensive assessment was undertaken under the WFD to establish the current situation of water resource management within the State at a river basin scale. The analyses undertaken involved gathering information on all environmental pressures likely to affect the waters concerned and all available information on the current condition of water bodies arising from the water quality survey work of the local authorities, the EPA and the fishery agencies. Criteria and thresholds were developed for each type of pressure and impact in relation to the level of risk that these represented. The outcome is a quantification of water bodies at risk of not achieving the WFD objectives due to various pressures, as presented in Fig. 1.

In contrast to the aims of many of the preceding water directives, which seek to protect specific uses of water, the WFD is

concerned with the protection of the overall aquatic ecosystem. The aim is to achieve high quality conditions of good status in all waters that are only slightly degraded from those of the natural or reference state. This target, which must be achieved by 2015, is likely to be very demanding in many cases, especially in waters where there has been a long history of pollution or, as with many surface waters, where significant physical disturbance has occurred.

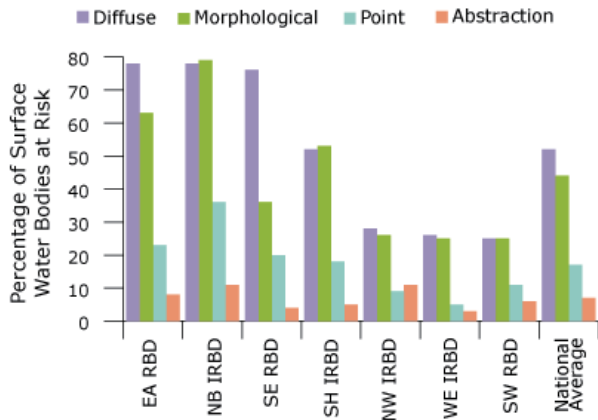


Fig. 1. Percentage of surface water bodies at risk^a from various pressures in each river basin district (RBD) (Source: Water Framework Directive Characterisation Report for Ireland 2005 submitted to European Union by EPA)

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