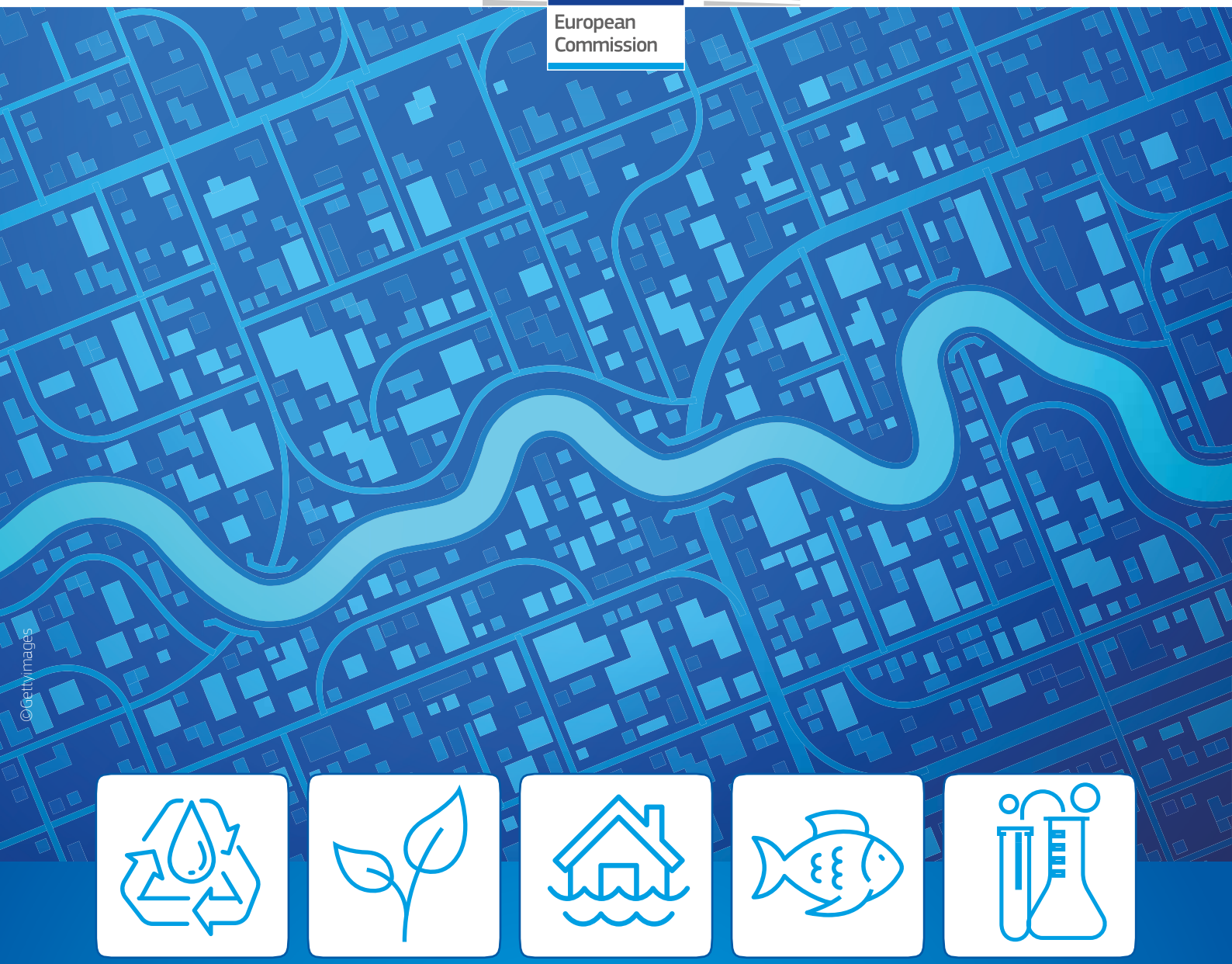

Fitness Check of the Water Framework Directive and the Floods Directive

Environment

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COMMISSION STAFF WORKING DOCUMENT

FITNESS CHECK
of the

Water Framework Directive, Groundwater Directive, Environmental Quality Standards Directive and Floods Directive

Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy

Directive 2006/118/EC of the European Parliament and of the Council on the protection of groundwater against pollution and deterioration

Directive 2008/105/EC of the European Parliament and of the Council on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council

Directive 2007/60/EC on the assessment and management of flood risks

{SEC(2019) 438 final} - {SWD(2019) 440 final}

Executive summary

This fitness check is a comprehensive policy evaluation of the following directives:

- the Water Framework Directive (WFD);
- the Environmental Quality Standards Directive (EQSD);
- the Groundwater Directive (GWD);
- the Floods Directive (FD).

It assesses whether the Directives are fit for purpose by examining their performance against five criteria set out in the Commission's Better Regulation agenda: effectiveness, efficiency, coherence, relevance and EU added value.

The results for the Water Framework Directive, complemented by the Environmental Quality Standards Directive and the Groundwater Directive, are mixed. On the one hand, the WFD has been successful in setting up a governance framework for integrated water management for the more than 110,000 water bodies in the EU, slowing down the deterioration of water status and reducing (mainly point source) chemical pollution. On the other hand, no substantial progress in water bodies' overall status has been made between the first and the second river basin management cycles. The Directive's implementation has been significantly delayed and less than half of the EU's water bodies are in good status, even though the deadline for achieving this was 2015, except for duly justified cases. For the Floods Directive it is too early to draw conclusions, as its first implementation cycle only started in 2016, but this fitness check finds that the Directive has improved flood risk management.

Good water management is important for the planet, people and the economy

Water is an essential societal need. The objectives of the Directives are as relevant now as they were at the time of the adoption of the Directives, if not more. They contribute to achieving a range of sustainable development goals. Water is also of great value in the EU economy. The EU's water-dependent sectors generate €3.4 trillion, or 26% of the EU's annual gross value added, and employ around 44 million people. EU water policy is very important to European citizens. The public consultation received more than 370,000 responses in total, which is an exceptionally high number.

Factors that have contributed to and stood in the way of achieving progress

Factors that have contributed to the effectiveness of the Directives in progressing towards their objectives include:

- the list of priority substances;
- the (binding) cross-references to the WFD's objectives in other EU policies;
- EU funding;
- the widely applicable non-deterioration principle; and
- the Directives' monitoring requirements.

One of the factors that hindered the achievement of better results was the fact that it proved more difficult than envisaged to establish a governance framework that takes into account the specific conditions in each Member State. In addition, good status depends not only on mitigation measures to address current pressures, but also on restoration measures to address pressures from the past, such as hydromorphological changes and chemical pollution. Finally, good status of water bodies also critically depends on the full implementation of other pieces of EU legislation, such as the Nitrates Directive and the Urban Waste Water Treatment Directive, as well as better integration of water objectives in other policy areas such as agriculture, energy or transport. This has not happened yet at the scale necessary.

Lack of financial resources is another factor that stands in the way of achieving better results. The measures proposed by Member States are often determined by what can be delivered with the budgets and policies already in place, rather than being the result of an integrated approach. Member States tend to rely on easy technological fixes that address point source pollution, while leaving diffuse sources of pollution largely unaddressed. This leads to ineffective implementation, because the approach taken is not based on the pressures and impacts analysis and monitoring data, which would help Member States determine what action is needed to target the pressures on water bodies and determine the scale of the action needed. For the Water Framework Directive, studies on the value of ecosystem services and the restoration of rivers indicate that: (i) the benefits of measures to improve the status of water bodies outweigh the costs; and (ii) citizens' willingness to pay exceeds the current expenditure on water measures. Insufficient use is being made of the principle of cost recovery, while exemptions based on disproportionate costs are not always adequately justified. For the Floods Directive, studies show that the cost/benefit ratio of flood protection measures is positive.

There is a trade-off between enabling location-specific water management and enforceability

The analysis in this fitness check finds that there is a trade-off between the flexibility of the Directives, which is needed to enable Member States to implement the most cost-effective measures, and the complexity that this flexibility creates, which forms an impediment to enforceability and achieving better results.

Many of the pressures on water, and the measures required to mitigate them, are location-specific. This is why, in line with the principle of subsidiarity, the Directives covered by this fitness check have introduced an integrated water management approach which leaves considerable discretion to the Member States to identify location-specific measures to meet the objectives, while at the same time ensuring sufficient harmonisation and a level playing field. At the same time, many water issues are transboundary: all Member States, except Malta and Cyprus, share international river basins, meaning that changes in one Member State can have an impact on hydrology or water quality in other Member States.

The complexity of the Water Framework Directive is a consequence of the need for location-specific measures. In practice, however, this is found to be a factor that stands in the way of enforceability and of holding Member States accountable for the insufficient ambition of their water policy. The extensive requirements for the river basin management plans and for public consultation are necessary to keep the policy discretion provided for by the WFD in check and provide public transparency about water policy and actions. There is no evidence of excessive administrative burden in terms of monitoring and reporting requirements. Having said that, citizens, Member State representatives, environmental groups and the water sector have indicated that there is room for improvement, both in the accessibility of information and in the level of detail. Efforts are being made to address these issues, to simplify the reporting requirements and to lower the administrative burden, for example through improved electronic reporting.

Contrary to traditional command-and-control approaches, the Water Framework Directive's innovation was to put the needs of a healthy ecosystem as the objective to be reached and requires doing what is necessary cost-effectively across all sectors and pressures to reach this objective. The WFD's governance mechanism is therefore designed in such a manner that it enables Member States to bring together all the relevant knowledge, based on monitoring and stakeholder participation, to set up management plans based on river basins and to collaborate across borders. One key achievement is that this has significantly increased the knowledge base about the EU's aquatic ecosystems, which is also used to inform other policies. The monitoring of trends of certain pollutants has, for the first time, provided Member States with the necessary

information to manage the presence in the water environment of pollutants which are not or no longer authorised, e.g. from illegal use or from run-off.

In sum: the Directives are fit for purpose, with some scope to improve

The analysis of the evidence and the stakeholder feedback allow for the conclusion that the Directives are largely fit for purpose. The Directives have led to a higher level of protection for water bodies and flood risk management than could have been expected without them. The fact that the WFD's objectives have not been reached fully yet is largely due to insufficient funding, slow implementation and insufficient integration of environmental objectives in sectoral policies, and not due to a deficiency in the legislation.

Future outlook — lessons learned

Based on the findings, progress towards good status can be expected to be slow but steady. The slow rate of progress can be attributed to the factors outlined above, in addition to long time lags for nature to respond to measures. It is also more difficult to make progress visible due to the 'one-out-all-out' principle underpinning comprehensive protection of water bodies and ecosystems, under which good status is not granted if any of the relevant parameters are less than good. As for future challenges, this fitness check finds that the Water Framework Directive is sufficiently prescriptive with regard to the pressures to be addressed, and yet flexible enough to reinforce its implementation as necessary with regard to emerging challenges not mentioned in the Directive such as climate change, water scarcity and pollutants of emerging concern (e.g. micro-plastics and pharmaceuticals).

The key area where there is room to improve and to achieve better results is on chemicals. While there is evidence that the WFD, EQSD and GWD have led to reduced chemical pollution of the EU's waters, the analysis points to three areas in which the current legislative framework is sub-optimal:

- the differences between the Member States are much larger than what can be explained by national differences (variability in lists of local pollutants (river basin-specific pollutants and pollutants posing a risk to groundwater bodies) and the limit values they should not exceed);
- updating the list of priority substances (i.e. adding or removing substances and the corresponding quality standards) is a lengthy process, partly because it takes time to gather the necessary scientific evidence and partly because of the ordinary legislative procedure;
- the EQSD and GWD evaluate the risk to people and the environment based mainly on single substances, not taking into account the combined effects of mixtures, and inevitably cover only a tiny proportion of the substances present in the environment.

The next round of programmes of measures will play a key role in ensuring the necessary progress towards achieving the environmental objectives by the 2027 deadline. Given that currently more than half of all European water bodies are under exemptions, the challenges for Member States are more than substantial. After 2027, the possibilities for exemptions are reduced, as time extensions under Article 4(4) can only be authorised in cases where all the measures have been put in place but the natural conditions are such that the objectives cannot be achieved by 2027. The Commission will need to continue to work with Member States and help them improve implementation of the Directives at the lowest possible cost, e.g. by sharing best practices on cost recovery, reduction of pollutants at source, green infrastructure and others.

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Acronyms

Acronym	Meaning
CIS	Common implementation strategy: informal cooperation under the Water Framework Directive and its daughter directives to support their implementation. The strategy gathers representatives from Member States, EEA/EFTA countries and all relevant stakeholders. The strategy also serves as a platform for the exchange of experience and develops guidance documents and policy papers.
EEA	European Environment Agency
EQSD	Environmental Quality Standards Directive
EQS	Environmental quality standard(s): under the Environmental Quality Standards Directive, limits on the concentration of certain substances or groups of substances identified as priority pollutants because of the significant risk they pose to or via the aquatic environment.
EU	European Union
FD	Floods Directive
FHRM	Flood hazard and risk maps: step 2 in the cycle of flood risk management introduced by the Floods Directive; these maps show how far floods might extend, the depth or level of water and the impacts there might be on human health, the economy, environment and cultural heritage.
FRM	Flood risk management
FRMP	Flood risk management plan: step 3 in the cycle of flood risk management introduced by the Floods Directive; these plans are required from Member States every 6 years and must set out appropriate objectives for the management of flood risk within the areas covered by the plan.
GDP	Gross domestic product
GWD	Groundwater Directive
MSFD	Marine Strategy Framework Directive
PFRA	Preliminary flood risk assessment: step 1 in the cycle of flood risk management introduced by the Floods Directive; these assessments lead to the identification of areas that are at significant risk of flooding.
PoM	Programme of measures: the tool under the Water Framework Directive designed to enable the Member States to respond appropriately to the relevant pressures identified at river basin district level during the pressures and impacts analysis, with the objective of enabling the river basin/water body to reach good status.
RBD	River basin district: unit of water management under the Water Framework Directive; a river basin district is an area of land from which all surface run-off flows through a sequence of streams, rivers and possibly lakes into the sea at a single river mouth, estuary or delta.
RBMP	River basin management plan: a comprehensive document required from Member States under the Water Framework Directive every 6 years, which should describe the actions envisaged to implement the Directive. The RBMPs cover many aspects of water management and identify all actions and measures to be taken within the river basin district in order to deliver the objectives of the Water Framework Directive.
RBSPs	River basin-specific pollutants: under the Water Framework Directive, pollutants identified by Member States as being of regional or local importance (in particular those listed in Annex VIII to the Directive) for which Member States must set environmental quality standards, conduct monitoring and establish control measures.
SDGs	Sustainable Development Goals

Acronym	Meaning
UoM	Unit of management (under the Floods Directive); in the vast majority of Member States, UoMs correspond to river basin districts.
UWWTD	Urban Waste Water Treatment Directive
WFD	Water Framework Directive
WISE	Water Information System for Europe, hosted by the EEA
WTP	Willingness to pay

Glossary

Term	Definition
Chemical status	Defined in the Water Framework Directive Article 2(24) and (25) for surface waters and groundwaters respectively. The chemical status of surface waters is determined by reference to environmental quality standards set at EU level for chemical pollutants, mainly the priority substances (Article 16 of the Directive). The chemical status of groundwaters is determined by reference to criteria including quality standards and conductivity (Article 17 of the Directive).
Cost recovery principle	The Water Framework Directive establishes the principle of cost recovery, whereby competent authorities should ensure that the costs of measures, including environmental and resource costs, are recovered, taking into account the polluter pays principle.
Good ecological status	Defined in Water Framework Directive Article 2(22) and Annex V, it comprises the quality of the biological community, the hydromorphological characteristics and the physico-chemical characteristics of water bodies.
Good ecological potential	Defined in Water Framework Directive Article 2(23) and Annex V, this is the equivalent of good ecological status for artificial and heavily modified water bodies.
Heavily modified water body	A water body resulting from physical alterations by human activity, which substantially change its hydromorphological character, for example, a harbour.
Implementation gap	The gap between the status quo, if not good, and being in compliance with the Directives' objectives.
Mixing zone	Zone adjacent to a point of discharge of pollutants within which the concentration of those pollutants may exceed the relevant environmental quality standards if this does not affect the compliance of the rest of the water body with those standards.
Non-deterioration principle	Principle in the Water Framework Directive under which Member States must take measures to prevent the status of their water bodies from deteriorating; an exemption from this principle can only be granted if certain requirements are met, one of which is the demonstration of an overriding public interest.
One-out-all-out principle	Principle in the Water Framework Directive underlying the definition of the status of water bodies; it ensures that all parameters are adequately considered in the effort to reach good status. For example, the status cannot be good if the status of any of the relevant biological quality elements is less than good or if the environmental quality standards in the Environmental Quality Standards Directive are exceeded for any of the substances listed in Annex X to the Water Framework Directive.
Priority substance	Substance identified in accordance with Water Framework Directive Article 16(2) and listed in Annex X. Priority substances are chemical pollutants that pose a significant risk to (or via) the aquatic environment at EU level. There are currently 45 of these priority substances listed in Annex X to the Water Framework Directive. Member States have to monitor their concentrations in surface waters and meet the environmental quality standards set for them within a certain timeline, unless they meet conditions that allow them to apply exemptions.
Priority hazardous substance	Priority hazardous substances are a subset of priority substances, of which they are the most dangerous. They are toxic, persistent and liable to bio-accumulate, or give rise to an equivalent level of concern. Because of these properties, the Water Framework Directive requires their emissions to the aquatic environment to be phased out within 20 years of

Term	Definition
	their designation as ‘priority hazardous’.
Watch list	List of substances for which EU-wide monitoring data are to be gathered for the purpose of supporting future reviews of the list of priority substances. These are substances for which the information available indicates that they may pose a significant risk, but for which monitoring data are insufficient.
Water body	For surface waters, a water body is a discrete and significant element of water such as a lake, reservoir, stream, river, canal or a part of one of these, or a transitional water or stretch of coastal water. For groundwater, a body of water is a distinct volume of groundwater within an aquifer or aquifers. According to Common implementation strategy Guidance No 2, ‘The ‘water body’ should be a coherent sub-unit in the river basin (district) to which the environmental objectives of the directive must apply. Hence, the main purpose of identifying ‘water bodies’ is to enable the status to be accurately described and compared to environmental objectives’.

1. Introduction: purpose and scope of this fitness check

This fitness check is a comprehensive policy evaluation of four Directives on integrated water management:

- the Water Framework Directive (WFD[1]) — Directive 2000/60/EC;
- the Environmental Quality Standards Directive (EQSD[2]) — Directive 2008/105/EC;
- the Groundwater Directive (GWD[3]) — Directive 2006/118/EC;
- the Floods Directive (FD[4]) — Directive 2007/60/EC.

It assesses whether the Directives are fit for purpose by examining their performance against the five criteria set out in the Commission's Better Regulation agenda[5]: relevance, effectiveness, efficiency, coherence and EU added value.

For each criterion, specific evaluation questions were prepared (see Annex 3). This includes: (i) examining implementation and integration successes and problems; (ii) the costs of implementation and non-implementation of the legislation; (iii) the administrative burden of implementation; and (iv) opportunities to reduce the burden without compromising the integrity of the Directives' purpose. This retrospective exercise considers what has worked well and what has not, and compares actual performance against earlier expectations. The results will be used by the Commission to inform future decisions on EU water policy.

This report has been prepared in accordance with Article 19(2) of the Water Framework Directive, which tasks the Commission with reviewing the WFD at the latest 19 years after the date of its entry into force (22 December 2000) and proposing any necessary amendments to it. It also covers the Environmental Quality Standards Directive and the Groundwater Directive, the WFD's two 'daughter' directives, because they are directly relevant to the environmental objectives and standards included in the WFD. Both daughter directives have annexes that require regular updating, and this fitness check contributes to the evidence base for the next updates.

While there is no specific article in the Floods Directive requiring evaluation, its evaluation was included in this fitness check because there are strong links between the WFD and the FD. These links are particularly strong for water quality and hydrological and morphological aspects of water management, but also in light of the increasing environmental pressures caused by extreme weather events resulting from climate change. The links between the WFD and the FD are also explicit in the legal requirement for coordination[6] between the management plans developed under both directives. This requirement has translated into strong links between the implementation of the WFD and FD at Member State and river basin district level.

[1] Directive 2000/60/EC.
[2] Directive 2008/105/EC.
[3] Directive 2006/118/EC.
[4] Directive 2007/60/EC.
[5] European Commission — COM/2015/0215 final.
[6] Art 9(2) FD.

This fitness check is also closely linked to the evaluation of the Urban Waste Water Treatment Directive (UWWTD[7]), which was carried out in parallel. The measures under the UWWTD are among the basic measures required under the WFD[8]; their implementation is therefore essential for the achievement of the WFD objectives. However, since the UWWTD is a directive that targets one specific pressure, it was evaluated on its own, with the results feeding into this fitness check.

Other pieces of EU water law, such as the Nitrates Directive (91/676/EEC), the Marine Strategy Framework Directive (2008/56/EC) and the Bathing Directive (2006/7/EC) are not part of the scope of this fitness check as their evaluations are due to be carried out in the near future. The Drinking Water Directive (98/83/EC) has been evaluated, and the proposal for its recast is currently under ordinary legislative procedure. Links with these directives, have been fully considered in this fitness check, particularly under the 'coherence' criterion.

Finally, this fitness check also follows on from the Commission's commitments in response to the Right2Water citizens' initiative, which promotes access to water and sanitation[9].

2. Background to the intervention

2.1. Description of the Directives and their objectives

History

European water legislation began in 1975 with the setting of standards for European rivers and lakes used for drinking water abstraction and bathing water. In 1980, binding quality targets were set for drinking water, and legislation was subsequently introduced on the quality of fish waters, shellfish waters and groundwater. At that time, the main emission control instrument applied to water-related directives was the Dangerous Substances Directive.

In 2000, EU water policy underwent a consolidation process, which led to the adoption of the WFD. Its aim was to promote a more holistic approach to water policy, streamlining existing freshwater legislation and adopting a river basin management approach. The WFD included a provision under which the Directive would be complemented to further refine the assessment of water status. The EQSD and GWD were subsequently adopted in 2008 and 2006 respectively.

The Floods Directive was adopted in 2007. It introduced a comprehensive and integrated approach to floods management after a period in which Europe suffered over 100 major destructive floods (between 1998 and 2004), including the record-breaking August 2002 flood on the Danube, the Elbe and their tributaries.

The Water Framework Directive

The Water Framework Directive is the most comprehensive and overarching instrument of EU water policy. It applies to fresh, coastal and transitional waters and ensures an integrated approach to water management respecting the integrity of whole ecosystems. It provides direction for and coherent links with several other EU directives relevant to water.

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[7] Recast Directive 91/271/EEC, http://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-4989291
[8] Article 11 WFD, see Section 2.2.
[9] http://ec.europa.eu/citizens-initiative/public/initiatives/successful/details/follow-up/2012/000003/en

The environmental objectives of the WFD are to:

- prevent deterioration of the status of water bodies; and
- protect, enhance and restore all water bodies, aiming to achieve good ecological status or good ecological potential and good chemical status for surface waters, as well as good quantitative and good chemical status for groundwater by 2015 (as laid down in its Article 4(1)).

Preventing further deterioration is thus key in the path towards achieving good status.

These environmental objectives fit into the more general purpose of the Directive (set out in Article 1) which is to establish a framework to protect inland surface waters, transitional waters, coastal waters and groundwaters. This includes preventing further deterioration, promoting sustainable water use, and improving and better protecting the aquatic environment.

A number of exemptions to the environmental objectives of the WFD may be applied if specific conditions are met.

- Article 4(4) allows for an extension of the deadline for achieving good status beyond 2015; this extension is limited to 2027 (end of the third cycle), unless natural conditions prevent the WFD objectives from being reached within the time limits set.
- Article 4(5) allows for less stringent objectives.
- Article 4(6) allows for a temporary deterioration in the status of water bodies owing to natural causes or *force majeure*.
- Article 4(7) sets out conditions in which deterioration of status or failure to achieve some of the WFD objectives may be permitted. This includes failure to achieve the objectives due to new modifications to the physical characteristics of surface water bodies or alterations in the level of groundwater, and failure to prevent deterioration from high to good status due to new sustainable human development activities.

The Environmental Quality Standards Directive

The 2008 Environmental Quality Standards Directive (EQSD), a 'daughter' of the WFD, established environmental quality standards (EQS), as required by WFD Article 16(8), for the 33 priority substances listed since 2001 in Annex X to the WFD, and for eight other pollutants already regulated at EU level. The EQS are the concentrations that should not be exceeded, either on an annual average basis (AA-EQS) or at any time point (Maximum Allowable Concentration EQS). These standards are used to determine the chemical status of surface water.

Based on a scientific review of more than 2,000 substances, the EQSD was revised in 2013[10], and thereby also Annex X to the WFD. Twelve substances were added to the priority substances list, including additional industrial chemicals, biocides, and plant protection products.

The Water Framework Directive requires the Commission to submit proposals for controls to reduce emissions, discharges and losses of all priority substances and eight other pollutants and to cease or phase out emissions, discharges and losses of the subset of priority hazardous substances.

[10] I.e. amended by Directive 2013/39/EU

By replacing five older Directives[11], the EQSD contributed to the Commission's Better Regulation initiative.

The EQSD also requires Member States to ensure that the concentrations of certain pollutants in sediment and biota do not significantly increase, and to establish inventories of pollutant emissions so that progress towards reducing and phasing out emissions can be assessed. The Directive further includes provisions for Member States to designate what are called 'mixing zones[12]', and to take account of transboundary pollution.

The 2013 revision of the EQSD established a new mechanism requiring Member States to monitor substances on a surface water watch list (first adopted in 2015 and revised in 2018) to gather information to support the review of the priority substances list. The substances included in this watch list are those for which the information available indicates that they may pose a significant risk at EU level, but for which monitoring data are insufficient. Monitoring of these substances is required in all Member States for a certain period, so that enough evidence can be collected for or against their future inclusion in the list of priority substances.

In 2019, as required by Article 8(c) of the amended EQSD, the Commission adopted a communication on a strategic approach to pharmaceuticals in the environment[13]. It identifies actions in six areas that could help to reduce the potential risk from pharmaceuticals in the environment. The areas cover all stages of the lifecycle of pharmaceuticals, from design and production through usage to disposal and waste management. There are actions to, for example: raise awareness and promote prudent use; incentivise 'green design'; reduce emissions from manufacturing; improve risk assessment; reduce waste; assess the feasibility of upgrading selected urban waste water treatment plants to reduce the presence of pharmaceuticals in effluent; and gather more monitoring data.

The Groundwater Directive

As required by WFD Article 17, the 2006 Groundwater Directive (GWD), another 'daughter' of the WFD, has as its main focus the prevention and control of groundwater pollution, with a view to ensuring the protection of drinking water sources and of dependent ecosystems[14]. The GWD was introduced to clarify the criteria in the WFD for good chemical status of groundwater, a task too complex to finalise at the time the WFD was adopted[15].

The GWD provides EU-wide groundwater quality standards for nitrates and pesticides (individual and total, in Annex I). For other pollutants, the setting of EU-wide standards was not at the time considered a viable option due to the high variability of many substances in groundwater and diverse range of hydrogeological settings and aquifer types. Consequently, the GWD currently requires Member States to set their own threshold values for application at Member State, river basin district (RBD) or water body level for all pollutants putting

[11] Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC.
[12] Zone adjacent to a point of discharge of pollutants within which the concentration of those pollutants may exceed the relevant EQS if this does not affect the compliance of the rest of the water body with those standards.
[13] European Commission — COM (2019) 128.
[14] The objective of good quantitative status is clear in the WFD, which aims to ensure a balance between abstraction and recharge.
[15] Hence fulfilling the obligation under Article 17 WFD, which requires the European Parliament and the Council to establish technical specifications to complement the overall groundwater regulatory regime in place.

groundwater bodies at risk of failing to meet good chemical status, taking into account identified risks and the minimum lists of pollutants in Annex II to the GWD[16].

Since groundwater moves slowly through the subsurface, the impact of anthropogenic activities may last for a relatively long time, which means that pollution that occurred some decades ago — whether from agriculture, industry or other human activities — may still be threatening groundwater quality today and, in some cases, will continue to do so for several generations to come. For this reason, the WFD requires measures to prevent or limit the input of pollutants into groundwater, and the GWD emphasises that upward pollution trends must be identified and reversed.

The GWD was revised in 2014. The changes to its Annex II included adding common principles for the determination of natural background levels (an important factor behind the high variation in threshold values) in Part A. In addition, nitrites, and phosphorus (total)/phosphates were added to the minimum list of pollutants for Member States to consider when setting threshold values. Finally, the revision introduced the need to incorporate clarifications and complementary provisions in the RBMPs regarding the way the procedure set out in Part A of the Annex has been followed. This revision also acknowledged the need to establish a voluntary watch list mechanism to increase monitoring and knowledge of substances posing a potential risk to groundwater (including emerging pollutants).

The Floods Directive

The main objective of the Floods Directive is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. In this way, it complements the WFD. The Floods Directive covers river floods, flash floods, urban floods, sewer floods and coastal floods.

The Floods Directive requires Member States to set objectives for flood risk management and to draw up measures to achieve them. It requires EU Member States to undertake the following, for each river basin or other management unit.

- *A preliminary flood risk assessment*, including a map of the river basin. This assessment consists of a description of: (i) past floods; (ii) flooding processes and their sensitivity to change; (iii) development plans; (iv) an assessment of the likelihood of future floods based on hydrological data, types of floods and the projected impact of climate change and of land use trends; and (v) a forecast of the estimated consequences of future floods.
- *Flood hazard maps and flood risk maps* (damage maps), for high-risk areas, i.e. those that could be flooded with a high probability (a 10-year return period), with a medium probability (a 100-year return period) and with a low probability (extreme events).
- Preparation and implementation of *flood risk management plans*, aimed at achieving the required levels of protection.

[16] (i) Substances or ions or indicators which may occur both naturally and/or as a result of human activities': arsenic, cadmium, lead, mercury, ammonium, chloride, sulphate, nitrites, phosphorus (total)/phosphates; (ii) 'man-made synthetic substances': trichloroethylene, tetrachloroethylene; (iii) 'Parameters indicative of saline or other intrusion': conductivity or chloride and sulphate (to be decided by Member States).

2.2. Integrated water and flood management

Challenges for water policy and flood management

One of the main challenges for water policy to be effective is that some of the pressures on water, and the measures required to mitigate them, are **location-specific**. This is demonstrated in Figure 1, which presents a view of the different pressures on European rivers. It shows that there are significant differences between Member States (and even within a Member State or river basin district) depending on the pressure.

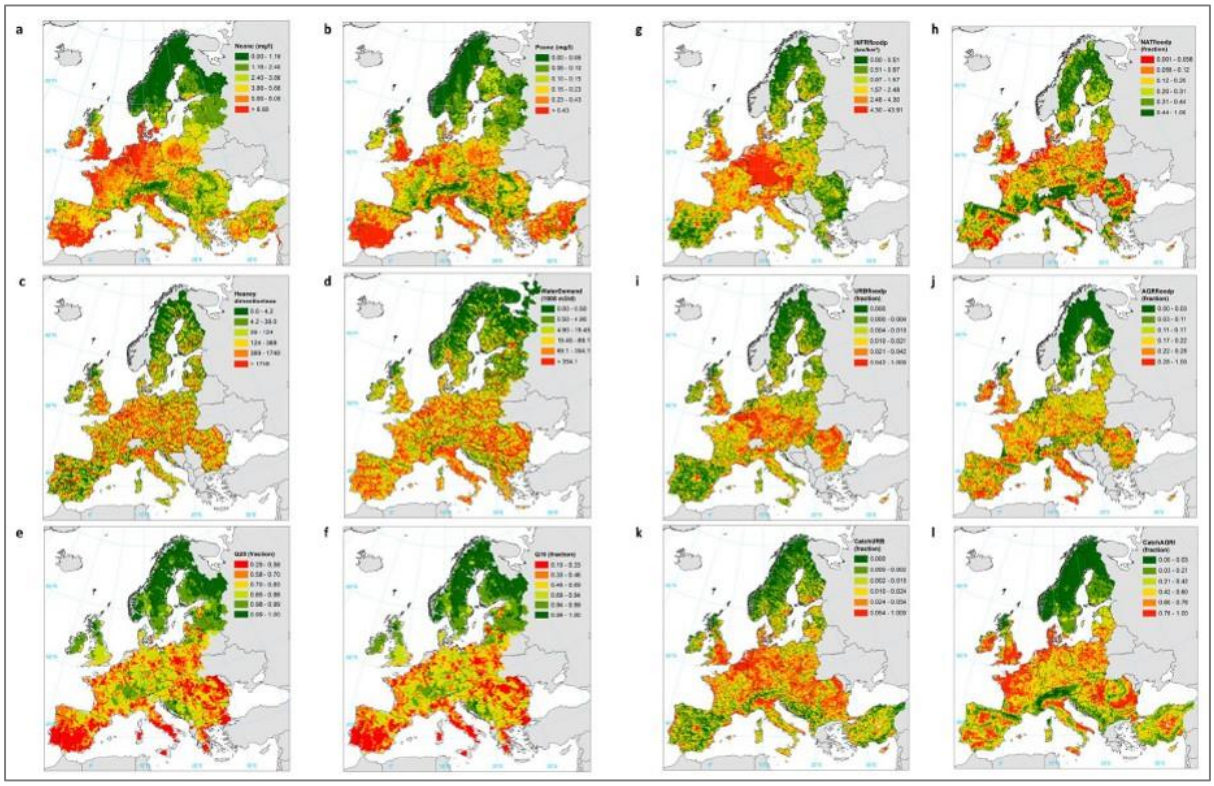


Figure 1: Maps of pressures on European rivers; (a) nitrogen concentration; (b) phosphorous concentration; (c) pollution from urban run-off; (d) water demand; (e) preservation of low flow at 25th percentile; (f) preservation of low flow at 10th percentile; (g) infrastructure in floodplains; (h) natural areas in floodplains; (i) urban areas in floodplains; (j) agricultural areas in floodplains; (k) artificial land cover in catchment area; (l) agricultural land cover in catchment area. (Source: Grizetti et al., 2017)

At the same time, some pressures require a similar approach across Europe. Many water issues are also transboundary: all Member States except Malta and Cyprus share international river basins, meaning that changes in one Member State can have an impact on the hydrology or water quality in other Member States. This requires an integrated approach, both across administrative borders and across different policy areas.

Taking into account the principle of subsidiarity[17], the Directives covered by this fitness check responded to these challenges by introducing a flexible framework which promotes an integrated approach to deal with all different pressures on water across different policy areas. This leaves considerable discretion to the Member States to set location-specific objectives,

[17] Currently Article 5(3) TEU.

methodologies and measures, while ensuring harmonisation and a level playing field.

Innovative approach to water management

The WFD introduced an innovative approach to manage and protect aquatic ecosystems in a holistic way, rather than focusing only on specific aspects of water quality. This approach considers all uses and users of water and the interlinkages between them.

First, rather than taking an approach that is only focussed on pollution control, the objective of the WFD is to ensure ecosystem integrity, which is translated into the 'one-out-all-out' principle. For surface waters, this means that if one of the parameters that determines ecological or chemical status is less than good, the water body's status will not be classified as good. It is thus not sufficient that priority substances in a surface water body are below the thresholds (good chemical status); to be in good status, the water body also needs to be in good ecological status, i.e. to meet certain requirements defined by the presence of e.g. phytoplankton (micro-algae), macrophytes (water plants), benthic invertebrates or fish. For groundwater bodies, the one-out-all-out principle means that if one of the parameters that determines chemical status or quantitative status is less than good, the water body's status will not be classified as good (see Figure 2).

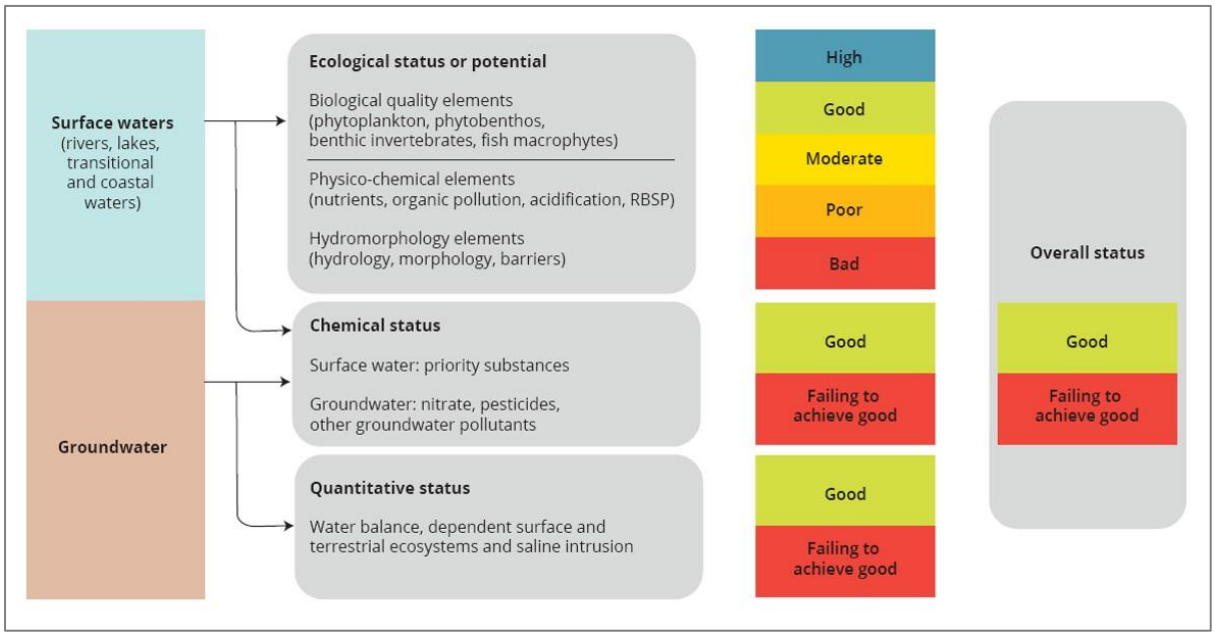


Figure 2: Assessment of status of surface waters and groundwater according to the WFD (Source: EEA (2018) State of European Waters)

Second, rather than limiting the management focus to ad hoc mitigation measures, the formal steps of the river basin management planning process guarantee an integrated approach by following the 'DPSIR model', which takes into account the interdependencies between drivers, pressures, status, impacts and results (see Figure 3):

- Article 5 requires Member States to undertake a pressures and impacts analysis, i.e. an assessment of drivers and pressures affecting the water environment, along with an assessment of the sensitivity of water bodies to the pressures identified and of the risk of failing to achieve good water status.

- Article 8 requires Member States to establish monitoring programmes to ensure that the state of the water environment is known, and that changes in this state over time can be captured and understood.
- Article 11 requires Member States to deliver a programme of measures (i.e. responses) to address the drivers, pressures and/or states.

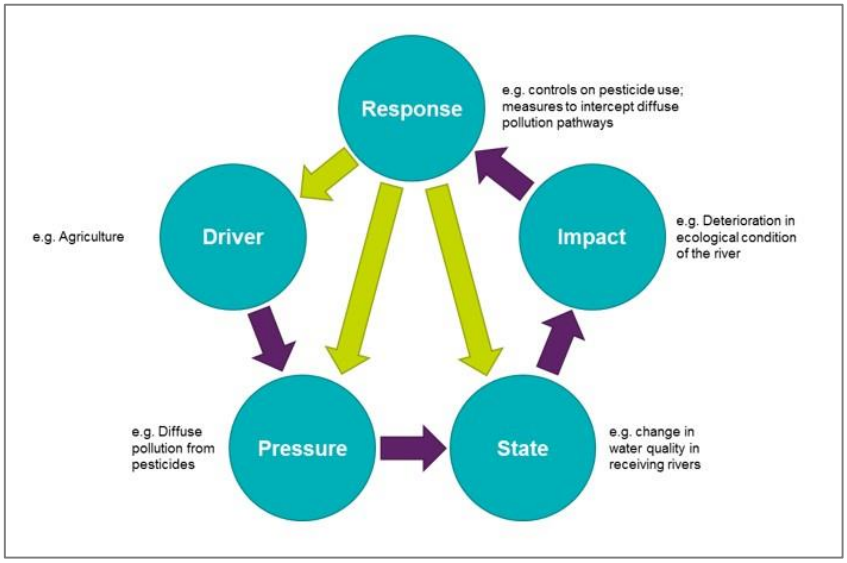


Figure 3: The DPSIR framework (Source: Wood, 2019)

To reach the environmental objectives, the WFD requires Member States to implement the 'basic measures'. These include measures that pre-date the WFD (Art 11(3)(a) and measures that are listed in Article 11(3)(b-l) (see Table 1 below). If these measures are not sufficient to reach the WFD's objectives, Member States need to implement 'supplementary measures'.

Basic measures in the form of laws pre-dating WFD (Art 11(3)a)	**Basic measures under the WFD (Art 11(3)b-l)**
- Urban Waste Water Treatment Directive (91/271/EEC) - Nitrates Directive (91/676/EEC) - Sewage Sludge Directive (86/278/EEC) - Drinking Water Directive (80/778/EEC) as amended by Directive (98/83/EC) - Bathing Water Directive (76/160/EEC). - Integrated Pollution Prevention and Control Directive (96/61/EC) - Major Accidents (Seveso) Directive (96/82/EC) - Birds Directive (79/409/EEC) - Habitats Directive (92/43/EEC) - Environmental Impact Assessment Directive (85/337/EEC)	b) measures to implement Article 9 (cost recovery) c) measures to promote efficient and sustainable water use d) measures to protect drinking water quality and reduce the treatment required e) measures to control abstraction from surface and groundwater f) measures to control recharging of groundwater g) measures to control point source discharges h) measures to prevent or control inputs of diffuse pollutants i) measures to address any other significant impacts on status, in particular the hydromorphological condition j) measures to prohibit direct discharges to groundwater k) measures to eliminate or reduce pollution by priority substances l) measures to prevent accidental pollution

Table 1 — Classification of basic measures under the WFD

Achieving the WFD's environmental objectives is thus conditional on full implementation of a number of other pieces of EU law.

Third, rather than following the regular administrative units of management, the WFD is based on integrated planning and management at river basin level, from the characterisation of water bodies to the definition and implementation of measures to reach the environmental objectives.

The framework for integrated floods management in the Floods Directive takes a similar approach to that developed for the WFD. It requires the planning of measures that includes river basins and coasts and widens the management focus to flood prevention, preparedness and protection.

Six-yearly reporting cycles to report on the approach taken

One of the governance innovations brought about by the WFD and the FD is the streamlined reporting of Member States' water policy. Figure 4 presents an overview of these reporting cycles since the adoption of the Directives.

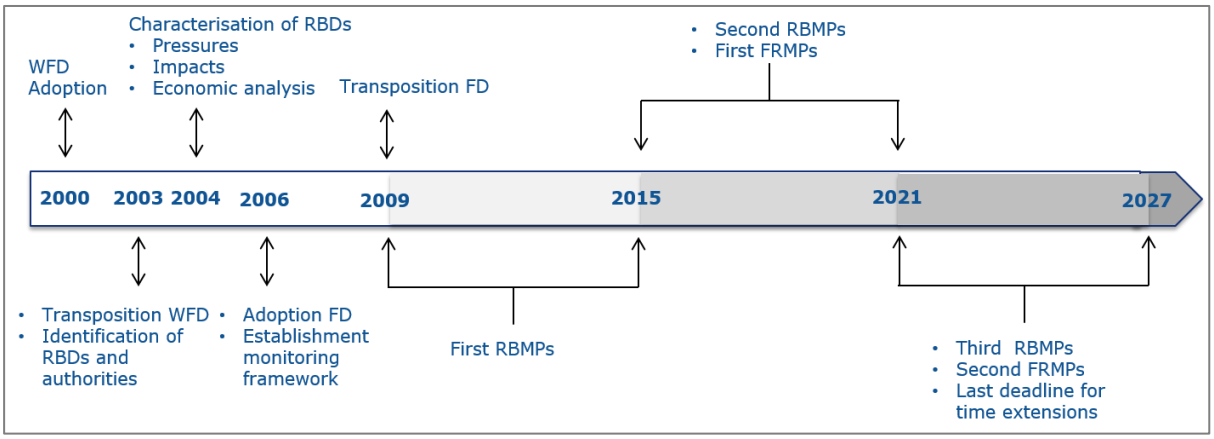


Figure 4: Overview of the deadlines and reporting cycles

River basin management plans are documents that contain the full analysis (e.g. characterisation of the water bodies, assessment of drivers and pressures, economic analysis, etc.) for every river basin district. Based on the RBMP, the programme of measures (PoMs) lists measures that will be implemented in the river basin district to reach the objectives, taking the form both of 'basic measures' and 'supplementary measures'. The RBMPs and PoMs have to be produced and reported to the Commission in six-year cycles starting from 2009. In addition, Member States voluntarily report data electronically to the Water Information System for Europe (WISE[18]) hosted by the European Environment Agency. This approach ensures full transparency of the analysis that underlies local water policy, while making sure that methodologies are comparable across the different Member States.

The Floods Directive takes a similar three-step cyclical approach to flood risk management by requiring Member States to first prepare preliminary flood risk assessments (PFRAs), leading to the identification of areas that are at significant risk of flooding. This is followed by the preparation of flood hazard and risk maps (FHRMs), showing how far floods might extend, the depth or level of water, and the impacts there might be on human health, the economy, environment and cultural heritage. The final step in each cycle is the preparation of

[18] WISE: Water Information System for Europe https://water.europa.eu/

flood risk management plans (FRMPs) and the identification of the necessary measures to reach the objectives in the FRMPs. The timing of the flood risk management plans is synchronised with the river basin management plans to maximise synergies and links; starting from the first FRMPs in 2015, the management cycles for the WFD and FD coincided. Consequently, since then Member States report their RBMPs and second FRMPs at the same time.

After each update of the river basin management plans and flood risk management plans, the Commission must publish a report to the European Parliament and to the Council on the implementation of the Directives that give rise to the respective management plans. The Commission report includes a review of progress in implementing the Directives and an assessment of the plans, including suggestions on how to improve future plans. The implementation reports are available at the following web pages:

- WFD: https://ec.europa.eu/environment/water/water-framework/impl_reports.htm
- FD: https://ec.europa.eu/environment/water/flood_risk/implementation_reports.htm

The common implementation strategy

Since 2001, the implementation of the WFD and its 'daughter directives' has been supported by informal cooperation under the 'common implementation strategy' (CIS). The strategy, which is not formally provided for in the legislation, is led by 'Water Directors' of Member States and the Commission, with the participation of all relevant stakeholders and European Economic Area/EFTA countries. As of 2007, the common implementation strategy also covers the Floods Directive.

The common implementation strategy has delivered more than 30 guidance documents and policy papers and served as a platform for exchange of experience and implementation of best practices among Member States[19]. Its focus is now increasingly on the exchange of best practice and on the discussion of policy developments.

2.3. Intervention logic

The set of directives covered by this fitness check offers a comprehensive regulatory basis to manage the EU's fresh, coastal and transitional water resources. Figure 5 presents the intervention logic for the Directives.

The societal needs addressed by the Directives are (i) water of adequate quality and quantity for all relevant uses, (ii) resilient aquatic ecosystems; and (iii) reduction and mitigation of the adverse effects of floods.

These needs are addressed by the Directives' objectives, which are to: (i) ensure that water bodies reach good status and do not deteriorate; and (ii) manage flood risks.

To achieve these long-term objectives, the WFD (supported by the EQSD and the GWD) and the FD set out an assessment framework. The framework requires Member States to: (i) make a comprehensive assessment of pressures, impacts and status of the aquatic environment; and (ii) carry out an economic analysis of water uses to enable them to identify the most cost-effective set of measures in every river basin district.

[19] See https://ec.europa.eu/environment/water/water-framework/objectives/implementation_en.htm

The outcome of this analysis is a set of instruments, namely the river basin management plans, the programmes of measures and the flood risk management plans (see Section 2.2 above).

It is difficult to isolate the legislation's short-term direct results and impacts due to the complexity of the policy framework and the fact that nature needs time to respond; results of measures may thus take some time to materialise. Eventually, however, the impacts of the measures should coincide with the Directives' objectives and lead to more global impacts such as the regeneration and preservation of ecosystems and a reduction in the adverse consequences associated with floods.

The pressures that the Directives are meant to address and the results of the measures taken can be influenced by external factors over which the Directives have no control. For example, increased global emissions of greenhouse gases will likely exacerbate the consequences and frequency of floods in the EU. These jeopardise the expected results of the Floods Directive, but are beyond the control of the Directive itself. Furthermore, the expected effects of the Directives are also influenced by legislation and strategies in other sectoral policies, which may greatly affect the status of water bodies[20].

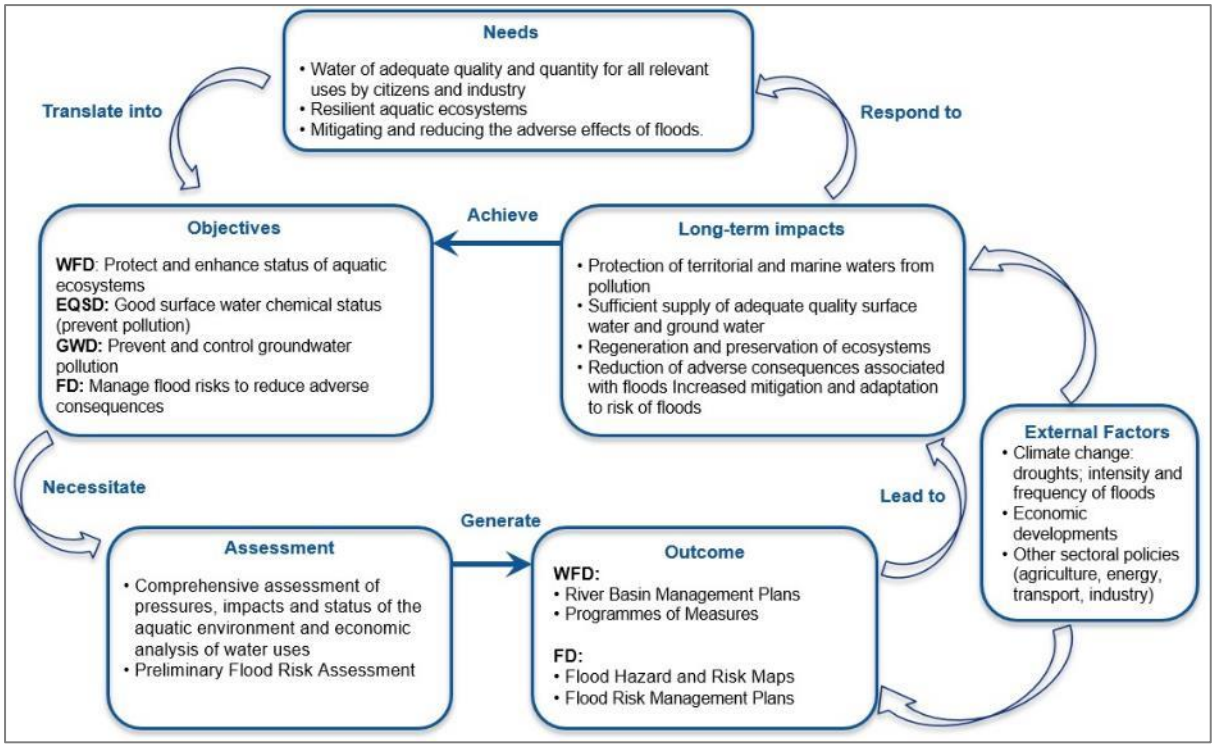


Figure 5: Simplified intervention logic of the Directives subject to this fitness check

2.4. Baseline

The EU Better Regulation guidelines[21] acknowledge that it is difficult to identify a robust baseline, i.e. a counterfactual situation if EU laws had not been adopted. This is particularly true for the Water Framework Directive, for several reasons.

[20] Likewise, the Directives may also have an effect on other policies such as climate change, security of supply of raw materials, and industrial policy.
[21] European Commission (2015) — SWD(2015) 111.

First, there are no quantitative data available from impact assessments. The original proposals for the GWD[22], for the EQSD and its revision[23], and for the FD[24] were subject to impact assessments. These included some information on the situation prevailing when they were carried out, for example on concentrations of candidate priority substances. However, they do not give a comprehensive picture (of status and management) before the WFD's introduction, meaning that they do not allow for comparison with the situation today. The WFD was not subject to an impact assessment before it was adopted in 2000.

Second, the WFD has led to the repeal and consolidation of a number of directives. It also refers to a number of 'basic measures' required by other EU legislation such as the Urban Waste Water Treatment Directive and the Nitrates Directive, which pre-date the WFD's entry into force. A study carried out for the Directorate-General for the Environment has confirmed that it can be difficult to distinguish between pre-WFD measures and WFD measures[25].

A third complication is that the data available cannot be compared or compiled into a time trend. The Commission's 5th implementation report, for example, explains the difficulty in comparing the status of individual water bodies between the first and second RBMPs. This is due in many cases to the re-delineation of the water bodies in question, but also, more generally, to the introduction of better methodologies and standards for classification and improved monitoring after the first cycle.

3. Implementation and state of play

3.1. State of European waters

Since the adoption of the WFD, the quantity and quality of the available evidence on water status and pressures has grown significantly. Many Member States and river basin districts have invested in new or better ecological and chemical monitoring programmes, with a greater number of monitoring sites and the inclusion of more chemicals and quality elements. Surface waters and groundwater have been monitored at more than 130,000 monitoring sites over the past 6 years. In the second set of RBMPs, this has resulted in both a marked reduction in the proportion of water bodies with unknown status and in a clear increase in confidence in status assessments.

Based on the data reported by the Member States in their second RBMPs, the European Environment Agency published a report on the state of European waters[26,27]. Overall, the report shows that the WFD's objectives have not yet been reached in the majority of the EU's water bodies (see Figure 6). The recently published State of the Environment Report 2020[28] confirms this conclusion, putting it in the more general framework of the gaps observed

[22] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52003SC1086&from=EN; in addition, the review of the annexes of the GWD in 2014 was supported by a background study that analysed the options http://ec.europa.eu/environment/consultations/pdf/background_groundwater.pdf

[23] http://ec.europa.eu/environment/water/water-dangersub/lib_pri_substances.htm#prop_2011_docs

[24] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52006SC0066

[25] COWI (2010).

[26] EEA Report 7/2018.

[27] The data from the second RBMPs (due in 2015), which are available in WISE, are generally from 2012-2013. More recent and more detailed data exist at national level.

[28] EEA (2019) 'The European environment - state and outlook 2020. Knowledge for transition to a sustainable Europe'

between the current state of the environment and existing EU policy targets. In assessing the state of progress towards the objectives, two factors should be noted. First, water takes time to react to measures (see Section 5.1). Second, the starting conditions differ widely between Member States, depending on the relative condition of each of their water bodies at the time when measures started to be applied.

Surface water bodies

On a European scale, around 40% of surface water bodies have good or high ecological status or potential, with lakes and coastal waters having better status than rivers and transitional waters (Figure 6 — map a). There has been limited change in ecological status since the first RBMPs were reported.

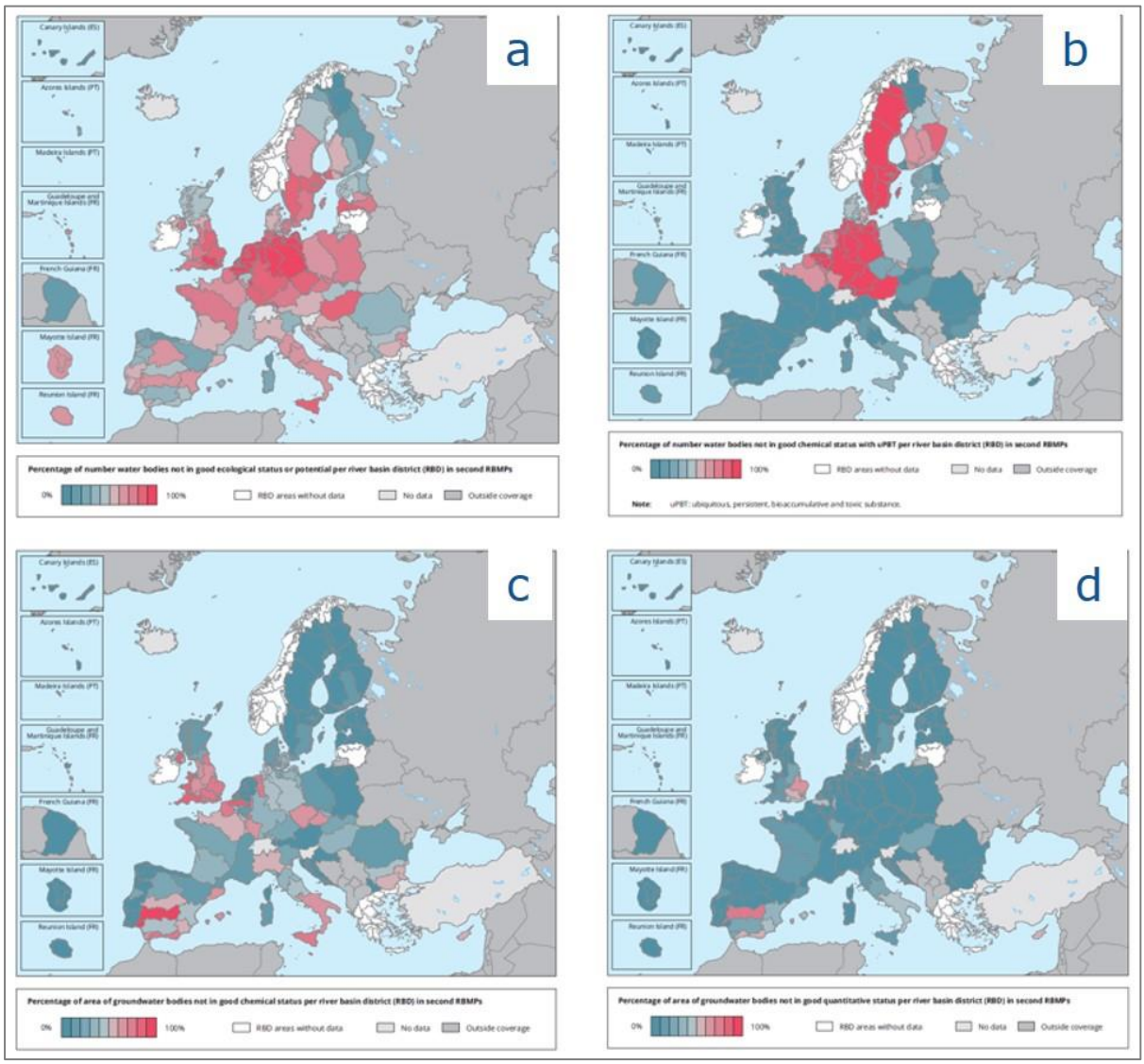


Figure 6: Status of EU water bodies in river basins — (a) ecological status of surface water bodies, b) chemical status of surface water bodies, c) chemical status of groundwater bodies, d) quantitative status of groundwater bodies (Source: EEA (2018) State of European Waters)

For surface waters, good chemical status is determined by limits (environmental quality standards) on the concentrations of certain pollutants found across the EU, known as priority substances. In the second RBMPs, 38% of surface water bodies had good chemical status, while 46% had not achieved good chemical status and for 16% their status was unknown (Figure 6 — map b).

Groundwater

With respect to groundwater, 74% and 89% of the area of groundwater bodies[29] had good chemical and quantitative status respectively (Figure 6 — maps c and d). This is a small improvement in status compared to the first RBMPs.

Pressures

Figure 7 provides an overview of the main significant pressures on surface and groundwater bodies. The most common pressure for surface water bodies is hydromorphology, which affects 40% of surface water bodies, followed by diffuse source pollution (38%), atmospheric deposition (38%), point source pollution (18%) and abstraction (7%)[30]. For groundwater, the main significant pressures are diffuse source pollution (35% of groundwater area), abstraction (17%) and point source pollution (13%).

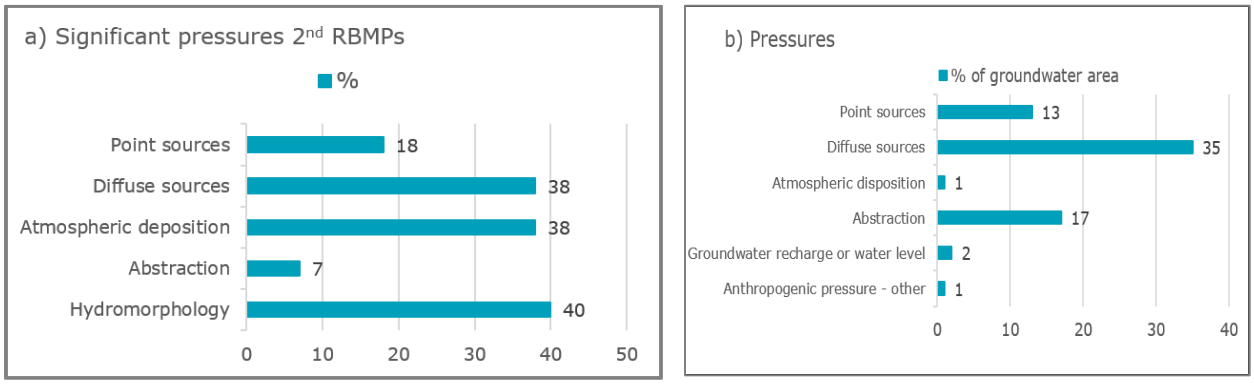


Figure 7: Significant pressures in the second RBMPs (Source: EEA (2018) State of European Waters)

Figure 8 presents an overview per Member State for these significant pressures (except atmospheric deposition) on surface water bodies.

[29] Due to the extremely large differences in size among groundwater bodies, any comparisons based on number of water bodies would have little meaning. Therefore the results are presented in terms of the surface area of groundwater bodies.

[30] These percentages reflect the percentage of all water bodies that are affected by the pressures in question.

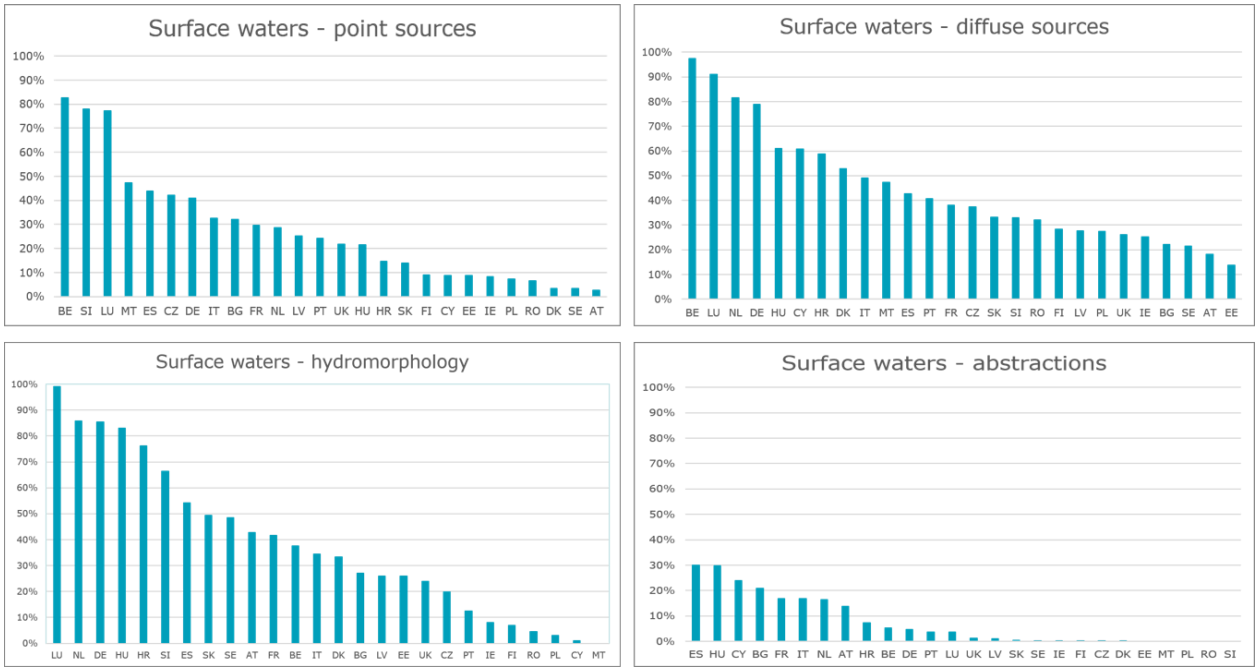


Figure 8: Main significant pressures on surface water bodies per Member State (Source: Data reported by Member States in WISE)

Hydromorphology

Hydromorphology is a term used to describe the hydrological and geomorphological characteristics (including continuity) of rivers, lakes, and coastal and transitional waters, including the underlying processes from which they result. Water and sediments interact at different scales and shape the physical environment, determining physico-chemical processes and providing a physical habitat for the biota. Hydromorphological alterations are associated with water storage, irrigation, flood protection, navigation, urban development and changes in land use. Hydromorphological pressures reported by Member States include physical alterations (26%[31]), dams, barriers and locks (24%), hydrological alterations (7%) or other hydromorphological alterations (7%).

Diffuse source pollution

Diffuse source pollution is mostly due to excessive emissions of nutrients (nitrogen and phosphorus) and chemicals such as pesticides, as well as deposition of some persistent substances from the atmosphere. For surface waters, agricultural production is a major source of diffuse pollution (25%). Other drivers include rural dwellings (emissions from households not connected to sewerage systems (11%), and run-off from urban areas (3%) and forested land (4%). Nutrient enrichment causes eutrophication, which in turn leads to the loss of aquatic biodiversity and a reduction in fish stocks. Excessive nutrient enrichment can be dangerous for human health, e.g. owing to toxic algal blooms, and can impair the use of water for drinking and bathing. It imposes significant costs on water companies to treat water. The primary impact on groundwater is from chemical pollution (22% of groundwater body area), followed by nutrient pollution (18%).

[31] Figures in brackets represent the EU average of surface water bodies affected by this pressure.

Point source pollution

The point source pressures on surface waters relate mostly to effluent discharges of pollutants from urban waste water (12%), followed to a lesser degree by discharges from storm water overflows (4%), industrial sites (3%) and aquaculture. The point source pressures affecting groundwater relate more to the leaching of hazardous substances from landfills and contaminated sites, including industrial sites, waste disposal sites, and mining areas, together with urban waste water.

Abstraction

Water abstraction is a key pressure on many water bodies, in particular during temporary periods of drought or in water scarcity-prone areas. Abstraction is a significant pressure for 7% of surface water bodies in the second RBMPs, with higher regional importance in southern Europe (e.g. in Spain, Italy and France). Abstraction (mainly for agriculture and public water supply) and artificial recharge are the main pressures on groundwater bodies in poor quantitative status.

3.2. Assessment of the second river basin management plans and first flood risk management plans

In February 2019, the Commission published an assessment report of the Member States' second river basin management plans and first flood risk management plans for 2016-2021, including some recommendations. The findings of this assessment are part of this fitness check and are reported in the analysis of the different evaluation criteria.

Key points on the second cycle of RBMPs

Governance

Member States have generally strengthened coordination among competent authorities in charge of water and other related policies although more progress is needed. International cooperation has improved in some basins, but additional efforts are still needed in many others, both between EU countries and for river basins shared with non-EU countries. Public consultation and the active involvement of stakeholders have been boosted in most Member States.

Knowledge base

The implementation of the WFD has led to a significantly better knowledge of the main pressures putting water bodies at risk of not achieving good status. Member States have made significant efforts over the past decade to ensure deployment of monitoring networks and to improve the methods for assessing the ecological and chemical status of surface waters. This was reflected in a significant reduction in the number of water bodies for which the status was unknown (as compared to the first RBMPs). Knowledge of the status of groundwater bodies and of the pressures affecting them has also improved across all Member States.

Monitoring networks and methodologies

Nonetheless, the report found that there are still some gaps in the monitoring networks, in particular in relation to hydromorphological aspects, and in some countries for some of the biological quality elements. There are also some significant gaps in monitoring and assessment of specific chemicals. This is partly because EQSs for some substances of

potential concern at national level have not always been derived in accordance with the technical guidance[32] developed under the common implementation strategy, sometimes resulting in their not being identified as RBSPs. Furthermore, the analytical methods used for some RBSPs and priority substances have not met the requirements of the relevant Commission Directive as regards their sensitivity[33]. Finally, the inventories of emissions for priority substances continue to be insufficiently developed, in particular for diffuse sources. For groundwater, there are also a number of gaps for both quantitative and chemical status monitoring.

Measures to address specific pressures

The 'basic measures' under the WFD have generally been defined, but their implementation varies strongly between Member States and by type of measure. Despite the significant pressures from agricultural activities, progress in this domain depends highly on the effect of voluntary measures, often in the context of the common agricultural policy. On water abstraction, some gaps have been identified on controls and registration, including exemptions for small abstractions.

Since the first cycle, significant improvements have been achieved on measures to tackle pollutants causing failures of chemical or ecological status, as well as on measures to reduce the negative environmental impacts of significant hydromorphological pressures. However, little progress has been made on protected areas for drinking water and on nature protected areas. Finally, in about half of the Member States, droughts were considered a relevant feature for water management. One of the key measures recommended by the Commission to mitigate drought impacts is a drought management plan, but this was not adopted in all relevant river basin districts.

Funding of measures and cost recovery

Overall, the Commission's implementation report found that the lack of funding is a significant obstacle to implementing the measures. Only 46% of RBDs reported that funding was secured to implement measures in all relevant sectors, while 17% reported having no financing secured at all. A number of Member States have upgraded their water pricing policies and improved the cost recovery of water services. However, significant gaps remain in translating these improved elements of economic analysis into concrete measures to internalise environmental and resource costs.

Exemptions

The Commission's implementation report also found that another hurdle towards effective implementation is the extensive use of exemptions, in many cases without appropriate and detailed justification. In particular, the time taken to achieve the objectives has been extended (under Article 4(4)) without a clear strategy to achieve good status by the extended deadline. It is not clear whether the necessary measures are being implemented in the meantime, which makes it unclear whether the WFD's objectives will be reached by 2027.

The next round of river basin management plans and programmes of measures will play a key role in ensuring the necessary progress towards achieving the environmental objectives by the 2027 deadline. To support and steer Member States in this process, the Commission

[32] Technical guidance for deriving environmental quality standards. https://circabc.europa.eu/w/browse/ba6810cd-e611-4f72-9902-f0d8867a2a6b

[33] Directive 2009/90/EC.

formulated recommendations addressed to all of them in its latest implementation report, complemented by Member State-specific recommendations. The EU-level recommendations call on Member States to: (i) continue improving stakeholder involvement; (ii) clearly identify the gap to good status for individual pressures and water bodies, and design, fund and implement targeted PoMs to close it; (iii) reduce reliance on exemptions and improve transparency over the justifications used; and (iv) ensure the proper implementation of cost recovery.

Key points regarding the first FRMPs

Objectives and measures

All Member States have set objectives for the management of flood risk and all included measures in their plans for achieving the stated objectives. There is still scope, however, to better detail the objectives and explain more clearly how the chosen measures will be effective in achieving these objectives. Most Member States have identified possible funding sources but did not make any budgetary commitments for the planned measures in their FRMPs. In all Member States, a broad range of stakeholders were involved in the preparation of the FRMPs.

Integration with other policies

Most Member States have sought synergies and coordination with the environmental objectives set out in the WFD. A total of 14 Member States have made specific links between their FRMPs and their national climate change adaptation strategies.

In the second round of FRMPs, Member States will need to further refine and complement their analysis and set out the necessary measures. To support them in this process, the Commission's recommendations to all Member States (in addition to Member State-specific comments) were to: (i) clearly link the implementation of measures to the achievement of objectives so as to assess progress from the second cycle onwards; and (ii) identify specific funding sources to secure the implementation of measures.

4. Method

4.1. Process

The Commission announced this fitness check in October 2017 with the publication of the roadmap[34]. This set out the scope and purpose of the fitness check and allowed for feedback from stakeholders. In reply, 82 responses were received, which were taken into account in the further process. The fitness check was closely coordinated with the evaluation of the Urban Waste Water Treatment Directive given the close links between the different directives. For further procedural information about this fitness check, see Annex 1.

The Commission also organised an extensive stakeholder consultation in accordance with the consultation strategy established at the beginning of the process. The consultation consisted of: (i) a general public consultation, which ran for 6 months; (ii) a targeted expert consultation; and (iii) several focus groups and stakeholder workshops.

[34] https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5128184_en

- The public consultation received more than 370,000 unique responses in total[35], which is an exceptionally high number. The vast majority of the responses (more than 368,000) were identical and thus were identified as being part of campaigns promoted by several environmental organisations. The remaining 1,944 responses were analysed separately.
- The targeted expert consultation consisted of an online survey, which was filled in by 205 individuals, and 74 interviews[36] with selected experts. The three focus groups were attended by more than 200 people.
- The Commission also received 90 unique position papers from various associations and organisations. A 'consultation group' of Member States' Water Directors also drafted a paper on the Water Framework Directive[37] as an input for this fitness check, and this was also considered.
- The fitness check also includes the findings of the 5th European Water Conference[38], which was jointly organised by the European Commission's Directorate-General for the Environment and the Austrian EU Presidency in September 2018.

All these stakeholder views were thoroughly analysed and synthesised by a contractor, and the key points were integrated into the replies to the fitness check's five evaluation criteria (Section 5). For a more detailed summary of the public consultation, including the summary of the views of the campaign respondents, see Annex 2.

4.2. Evidence gathering

To support its analysis, the Commission awarded a study contract to a consortium of experts[39], aimed at creating a robust evidence base. The contractor's analysis included an extensive review of all the relevant information and evidence that is available on the implementation and background of the four Directives. A non-exhaustive list of key sources that were consulted includes the following[40]:

- Commission implementation reports of the RBMPs and FRMPs
- the 2012 fitness check of the EU's freshwater policy ('Blueprint[41]')
- reports from the European Court of Auditors
- CIS technical reports
- studies and reports from Member States (including RBMPs and FRMPs)
- European Environment Agency reports and Joint Research Centre studies
- statistical data (e.g. from the European Environment Agency and Eurostat)
- EU-funded studies[42] and research projects[43]
- academic papers
- position papers from Member States and interest groups.

[35] The consultation received 385,088 responses, of which 15,010 were from the same respondent with identical responses. These were thus excluded from the analysis.
[36] Member State competent authorities, international river basin districts, NGOs, industry representatives and research organisations.
[37] https://circabc.europa.eu/ui/group/9ab5926d-bed4-4322-9aa7-9964bbe8312d/library/a2b1038f-2aa8-44e8-8288-d0f226fe2224/details
[38] https://ec.europa.eu/info/events/eu-water-conference-2018_en
[39] Consortium led by *Trinomics* and *Wood.*
[40] Trinomics and Wood (2019).
[41] European Commission — COM(2012) 673 and SWD(2012) 393.
[42] E.g. Ecorys (2019), Wood (2019).
[43] https://cordis.europa.eu/

Respondents to the public consultation further complemented the knowledge base for the fitness check by sharing data, studies and reports.

More information about the methods and evidence gathering can be found in Annex 3. The complete list of references used in this report can be found in Annex 4.

4.3. Limitations — robustness of findings

The EU Better Regulation guidelines acknowledge that it can be difficult to identify a robust baseline or to make a quantitative analysis. They confirm that in many cases EU evaluations have to rely on qualitative, reasoned arguments about the likely contribution of an EU intervention to the changes observed. This is particularly true for the Directives subject to this fitness check, for which data are scarce and often difficult to compare, especially on costs and benefits. The challenges specific to setting the baseline for this fitness check are discussed in detail in Section 2. Nonetheless, given the thorough triangulation behind the assessment through different sources used to underpin this fitness check (see Section 4.2), the overall findings and conclusions are considered robust.

5. Analysis

5.1. Effectiveness

The effectiveness analysis considers how successful the Directives have been in achieving or progressing towards their objectives (Section 5.1.1). It also looks in more detail at how the Directives have changed water management practices and governance in the Member States (Section 5.1.2) and which factors contributed to or stood in the way of achieving the Directives' objectives (Section 5.1.3).

5.1.1: 'To what extent are the Directives performing as expected?'

Overall response:

Progress towards the environmental objectives of the Water Framework Directive, notably the restoration and improvement of status of water bodies towards 'good', is at different stages. Overall, however, it has come about slower than anticipated. For well over half of Europe's surface water bodies and for a smaller percentage of the groundwater bodies, there is a gap to good status, for which the deadline was 2015 except in duly justified cases. A large majority of the respondents to the public consultation consider EU water legislation to have been very effective or moderately effective in preventing deterioration of status.

The noticeable progress in individual parameters is to a degree masked by the one-out-all-out principle. The communication of results of efforts to implement the WFD is often seen as hampered by the application of the one-out-all-out principle. Progress in individual parameters has been better reflected in recent reports, and further efforts to ensure transparent communication towards citizens are ongoing.

The Environmental Quality Standards Directive and Groundwater Directive have performed as expected. As to the EQSD, there has been improvement in chemical status, which, for certain individual priority substances, has been substantial. However, certain persistent individual substances (e.g. mercury) have a significant impact on status but cannot easily be tackled.

Progress under the GWD has been forthcoming, and groundwater has a comparatively better status than surface water in the EU today. While the overall knowledge of pollutants has increased across the EU, for emerging pollutants there is as yet no comprehensive data. For both the EQSD and the

GWD, the process of keeping up with science has proven slower than anticipated, and updates to the list of priority substances and to the list of substances in Annex I to the GWD involve lengthy and heavy procedures.

For the Floods Directive, as intended, all Member States have taken action and are in the middle of the first FRMP implementation period (2016-2021), applying measures to reduce flood risk. As yet there is no information on how far measures have been implemented, or on how far flood risk has been reduced[44].

The Water Framework Directive

Environmental objectives

The environmental objectives of the WFD include both ensuring that water bodies' status does not deteriorate and that they achieve good status (Art 4(1), see also Section 2.1). Depending on how far a water body has progressed on the path towards good status, the two objectives may be reachable only in sequence, with non-deterioration already constituting an important step towards good status.

Good status

The European Environment Agency's 2018 State of Water report and the Commission's assessment report of the second RBMPs showed that a significant part of Europe's water bodies has not yet met the good status objectives laid down in the WFD. These objectives had to be reached by 2015, with the possibility to rely on exemptions if certain conditions are met (see Section 2.1).

For surface water bodies, the WFD's objectives have only been achieved for 40% for ecological status and 38% for chemical status. The situation is better for groundwater. About 84% of groundwater bodies (representing 74% of the total groundwater body area) have good groundwater chemical status, while 92% of groundwater bodies (representing 89% of the total groundwater body area) have good status. No substantial improvement in water bodies in terms of their overall status could be demonstrated compared to the first cycle.

There are several reasons why progress has been limited, and why no substantial progress in water bodies' overall status appears to have been made between the two cycles. First, the second RBMPs (due in 2015) generally only show status classification up to 2012-2013, and at that time many measures were only in the process of being implemented. In addition, in some cases, nature's response time is slow and so it takes time before measures take effect. A second explanation is that due to increased monitoring, some water bodies previously classified as 'unknown' were now reported as 'less than good'. Furthermore, in the second cycle, overall stricter methodologies were often used due to the harmonisation of methodologies[45]. Finally, the effect of the one-out-all-out principle[46] is also important. Under this principle, if the status of one quality element is less than good, the overall status of the water body will also be less than good, irrespective of the status of other quality elements. While this principle is essential for integrated water management to protect ecosystems, it makes it difficult to show progress in a water body, as the status of that water body will not change until all other problems are also addressed.

[44] However, this should be the case from the second FRMPs onwards.
[45] See e.g. van Puijenbroek et al (2015).
[46] See WFD Arts. 2(17) and 2(19).

The one-out-all-out principle is an issue particularly with respect to ubiquitous, persistent bioaccumulative and toxic substances (uPBTs). The persistence of such substances means that they do not react quickly to any measures, masking progress towards good status in other pollutants. As can be seen in Figure 9, while only 38% of surface water bodies have good status, 81% would achieve good chemical status if uPBTs were not taken into account[47].

Indeed, only a few individual pollutants, the most common being mercury[48], have a large impact on status. Action is being taken both at EU and international level to reduce the emissions of mercury and other pollutants (e.g. through the Minamata Convention[49]), which has resulted in improvements in the levels for some individual substances. However, the concentrations in water remain too high in a large number of EU water bodies, and there are no realistic options to reduce those levels rapidly.

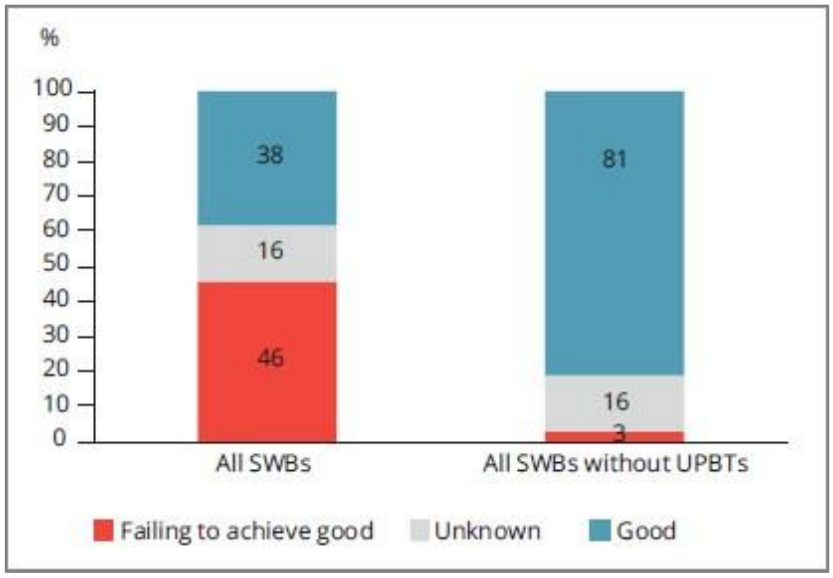


Figure 9: Chemical status of surface water bodies (SWB), with and without uPBTs (Source: EEA (2018) State of European Waters)

Non-deterioration

Aquatic ecosystems are among the most degraded habitats[50], yet EU-specific time trend data that sufficiently go back in time are rather scarce. This lack of time trend data makes it impossible to have a systematic overview of the contribution of the EU water legislation to halting the degradation of water quality in the EU.

Although the different actors involved in water quality management are generally aware of this contribution, they do not generally have the hard data to substantiate it. Their views are reflected in the results of the public consultation, where 76% of the respondents consider EU water legislation to have been very effective or moderately effective in preventing deterioration of status. Of the responses indicating 'very effective' or 'moderately effective'

[47] 3% would fail good status and 16% would have unknown status. The uPBTs are mercury, pBDEs, tributyltin and certain PAHs.

[48] Other ubiquitous, persistent, bioaccumulative and toxic substances causing failure to meet good chemical status are pBDEs, tributyltin and certain polycyclic aromatic hydrocarbons (benzo(a)pyrene, benzo(g,h,i)perylene, indeno(1.2.3-cd)pyrene, benzo(b)fluoranthene and benzo(k)fluoranthene).

[49] http://www.mercuryconvention.org/

[50] See e.g. IPBES (2018).

(n=483)[51], most came from EU citizens (40%) and industry (28%). Likewise, representatives from industry acknowledged in bilateral exchanges that the WFD and its daughter directives have been instrumental in the protection and recovery of water bodies across Europe.

In the absence of systematic data, some punctual examples can be found in the literature. One example is a recent article[52] on the decline of seagrass[53] meadows in Europe between 1869 and 2016. The article demonstrates how one third of European seagrass was lost due to disease, deteriorated water quality and coastal development, with losses peaking in the 1970s and 1980s. It shows how seagrass loss rates started to slow down towards the end of the 20th century and points out the WFD's role in reversing the trend, including by bringing seagrass to the attention of policy-makers and making it mandatory that seagrass meadows be restored in order to reach good ecological status by 2015[54].

A framework for the protection of European waters

One key achievement of the WFD is that it has established a framework for the protection of waters (as required by Article 1, see also Section 2.1). This framework has brought about a systemic change in water governance that allows for flexibly tailoring water management to location-specific conditions while facilitating coordination across administrative and geographical boundaries. This is not a minor achievement, as it put in place the governance framework that enables Member States to work towards achieving the WFD's environmental objectives. This point is explained in detail in Section 5.1.2.

Challenges

One drawback of an approach based on subsidiarity is that for certain issues there are considerable variations in how Member States have implemented the Directives, where a more uniform approach may have been desirable. These variations may in some cases be due to local differences, but in many cases can only be explained by various other factors, such as political will (see also Section 5.2.1 on cost recovery), resistance to change or lack of technical capacity (see e.g. Section 5.2.3 on monitoring).

One example of an issue where methodological harmonisation has been insufficient is the way in which hydromorphological quality elements are linked to biological quality elements, which varies between Member States[55]. Likewise, the implementation of Article 4(7) of the WFD on how to deal with new physical modifications to water bodies differs considerably from one Member State to another. Similarly, the way in which Member States designate specific water bodies as heavily modified, and the way in which good ecological potential is

[51] 'n' = total number of respondents to this question. Given that most questions in the public consultation were not mandatory, the total 'n' changes per question.
[52] De los Santos et al (2019).
[53] Seagrasses, marine flowering plants forming underwater meadows, play a key global role in supporting fisheries production, climate change mitigation and coastal protection. They rank among the most threatened ecosystems on Earth, with global loss rates accelerating from 0.9% per year in the 1940s to 7% per year towards the end of the 20th century.
[54] Other contributing factors quoted are basic measures addressing nutrient loads and the Habitats Directive.
[55] Within the WFD, there is a difference of requirements regarding supporting elements in Annex V between the physico-chemical and hydromorphological quality elements. In particular, the physico-chemical quality elements are explicitly required for good and high status, while the hydromorphological quality elements are only required for the classification of high status. In terms of implementation, Member States have applied the elements in different ways for status classification and in the information that has been reported. In particular, a significant number of Member States have not reported assessment results for hydromorphological quality elements in their second RBMPs.

defined in those water bodies, are also highly variable. Work on these aspects is ongoing, and the results are expected to contribute to a more harmonised approach in the third cycle of RBMPs[56].

Another example is the large variability in the river basin-specific pollutants that have been identified by the Member States. While it is expected that different pollutants are identified as posing risk in different RBDs, there is no clear justification for the standards used for the same pollutant to be very different for different RBDs. This issue is further discussed in Section 5.3.1 on coherence. The issue of variability in the number of pollutants posing a risk to groundwater bodies and the ranges of threshold values are discussed further below in this section.

The Environmental Quality Standards Directive

Chemical status of surface waters is assessed against a relatively short list of important pollutants called priority substances listed in Annex X to the WFD. The concentration of a substance in the water is compared with an environmental quality standard (EQS) set in the EQSD. Substances are included in the list of priority substances based on the scientific assessment of their toxicity to humans and the aquatic environment, e.g. because they are directly toxic, limit organisms' ability to reproduce or because they bio-accumulate in food chains and have the potential to cause cancer.

Member States are making significant progress in tackling certain individual priority substances

Even if no progress in the chemical status of surface water bodies could be observed between the first and second RBMPs — mostly due to the presence of ubiquitous persistent, bio-accumulative and toxic (uPBTs) substances — there have been improvements in relation to other priority substances. For example, a reduction has been noted in the number of water bodies failing to meet standards for several metals (cadmium, lead and nickel) and some pesticides.

A comparison of the chemical status reported in the first and second RBMPs shows that chemical status has improved in transitional and coastal waters, remained similar in rivers and declined slightly in lakes (Figure 10). The proportion of water bodies with unknown status has dropped significantly. Consequently, knowledge on chemical status has improved, but in some cases this additional knowledge led to water bodies which had unknown status being classified as failing to achieve good chemical status.

[56] The EU Water Directors decided that the differences concerning heavily modified water bodies and good ecological potential needed to be further discussed and include the development of CIS guidance on good ecological potential in the CIS work programmes for 2016-2018 and 2019-2021.

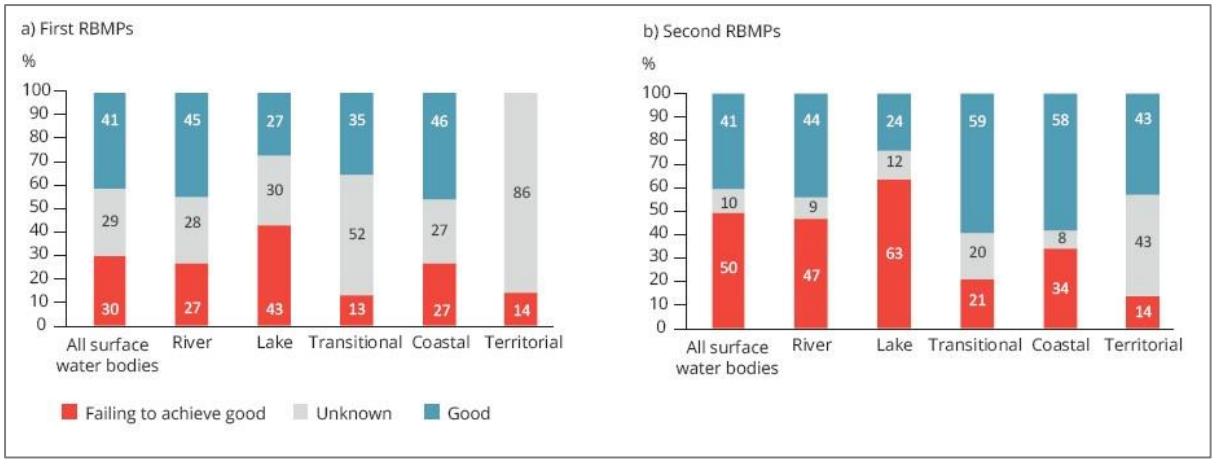


Figure 10: Change in chemical status of surface water bodies, by water category (Source: EEA (2018) State of European Waters)

Member States are making significant progress in tackling certain individual priority substances, but are experiencing difficulties in dealing with mercury, pBDEs and PAHs. For several pollutants, one third of water bodies reduced concentrations between the first and second RBMPs (Figure 11).

In the case of cadmium, nickel and lead, 943 water bodies improved in status between the first and second RBMPs, compared with 2,137 continuing to fail in the second RBMPs. On pesticides[57], 571 water bodies improved from failing to good, compared with 621 water bodies still failing in the second RBMPs. If this rate of development continues during the next cycle, the number of water bodies failing to achieve good status as a result of priority pesticides may become very small.

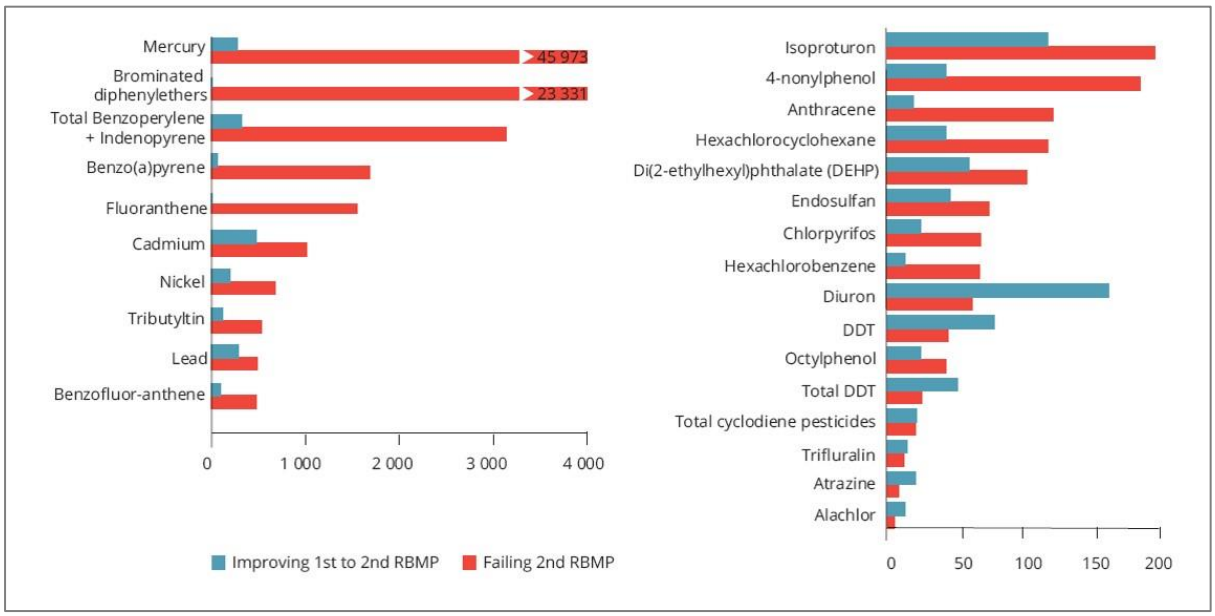


Figure 11: Numbers of water bodies that have improved levels of a priority substance since the first RBMPs and the number that failed to improve in the second RBMPs (Source: EEA (2018) State of European Waters)

[57] Alachlor, atrazine, chlorfenvinphos, chlorpyrifos, total cyclodienes, p,p'DDT, total DDT, diuron, endosulfan, hexachlorobenzene, hexachlorohexane, isoproturon, pentachlorophenol, simazine and trifluralin.

Increased knowledge of pollutants

Overall, the EQSD's performance has been as could be expected. The setting of EU-level EQS has led to a level playing field for the individual substances, and comparability as regards chemical status assessment. It has also considerably improved knowledge of and data about pollutants in water and aquatic ecosystems. The monitoring requirements included in the WFD and EQSD have, for example, led to very significant developments in analytical methods for certain substances, for which they either did not exist or were not sufficiently sensitive. Furthermore, the monitoring of trends of certain pollutants in sediments and/or biota has provided Member States with information to help them manage the presence in the water environment of pollutants which are no longer authorised. Such pollutants can enter water through illegal use, from poorly protected stores of old chemicals, from landfills or contaminated land (by leaching or run-off) and by atmospheric deposition. Monitoring may also detect spills of authorised chemicals. Such findings should then trigger action by the competent authorities. Chemicals monitoring data should also be used to build emission inventories[58], but this is not the case in all Member States. Inadequate inventories hinder comprehensive assessment of progress towards the objectives of controlling chemical pollution.

Challenges

Priority substances

Most of the chemicals designated as priority substances in 2001 (and listed with EQSs in 2008) had long been recognised as harmful to, or via, the aquatic environment. They are a small subset of the thousands of chemicals found in the environment, and many have faced restrictions on their use for decades. As already noted, some behave as uPBTs and still cause failure of existing EQS.

Furthermore, some countries that have already applied the revised (2013) standards for existing priority substances, which are to be met by 2021. In Sweden, none of the water bodies met the revised biota standard for polybrominated diphenyl ethers. In Luxembourg, none of the surface waters met the revised standard for fluoranthene (a PAH), while the Netherlands expects this to be the case in its next RBMP.

Pollutants of emerging concern and mixtures

The newly listed priority substances (from 2013) are not yet reflected in the second RBMPs. However, the watch list mechanism, established in 2013 to generate data on pollutants of emerging concern, has resulted in the reporting of data on several emerging pollutants. The latest Commission implementation report highlights the challenge of managing pollutants of emerging concern. For example, in their pressures and impacts analysis, Member States should identify pollutants of national concern (including emerging pollutants) as RBSPs, but since they use different methodologies to select RBSPs, they do not always consistently identify relevant substances.

The current priority substances list includes some groups of substances, but most are listed singly. Thousands of other substances are not addressed at all because they are not listed. It has also been recognised that mixtures of substances may have synergistic effects. Because

[58] Pistocchi et al (2019).

of these issues, attention is increasingly being given to methods for detecting the presence of pollutants and mixtures of pollutants using effect-based methods.

Updating the list of priority substances is a time-consuming process

The process for regular revisions of the list of priority substances and of the associated EQS is procedurally heavy, as each revision requires the ordinary legislative procedure. In addition, identifying the substances which should be added to (or removed from) the list of priority substances can also be a lengthy process. This is due to the need: (i) for scientific work to identify the substances that pose risks to the aquatic environment or to human health via the aquatic environment and; (ii) in several cases, to develop adequate analytical methods for those substances.

The watch list mechanism introduced in 2013 uses implementing acts to establish and revise the list, and so is much simpler than the co-decision procedure. Nonetheless, the process to update the watch list of substances is still relatively time consuming because of the need to carry out extensive analyses of the risk they may potentially cause and, in some cases, of the need to develop appropriate methods for monitoring their presence in the water. This issue is discussed further in the analysis of relevance (Section 5.4.1).

The Groundwater Directive

The Groundwater Directive complements the Water Framework Directive in setting up environmental objectives for good groundwater chemical status.

Groundwater constitutes the largest reservoir of freshwater in the world, accounting for over 97% of all freshwater available on earth (excluding glaciers and ice caps). It provides a major source of drinking water for many EU citizens as well as the steady base flow of rivers and wetlands. Maintaining this resource and keeping it free of pollution is vital both for humans and for surface-water and terrestrial ecosystems. Once pollutants are in groundwater, recovery can take years or even many decades because of residence times and the slow degradation of pollutants.

Progress is slow but can be observed

Member States' reports on the second RBMPs show that 74% of EU groundwater area has good chemical status and 25% has poor chemical status, with 1% of unknown status (Figure 12[59]). Given the long time-scales associated with pollution of groundwater, this is a small but significant improvement since the first RBMPs.

[59] Data from the second RBMPs include 13,411 groundwater bodies, which cover 4.3 million km².

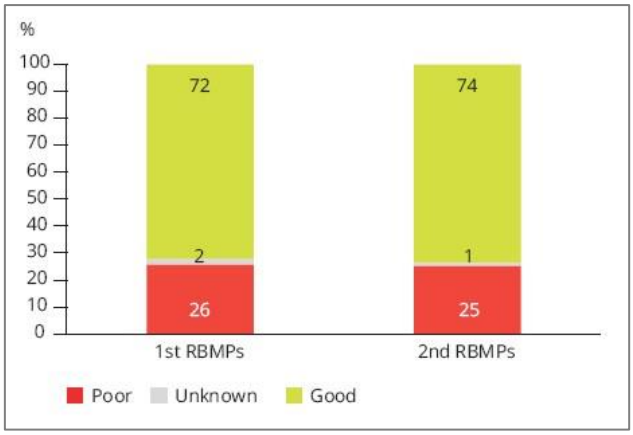


Figure 12: Chemical status of groundwater bodies, by area, reported in first and second RBMPs (Source: EEA (2018) State of European Waters)

The total groundwater body area with an identified upward trend (9.9% of area) is nearly double that with a trend reversal (5.9% of area). Significant and sustained upward trends were identified for 58 pollutants, mainly nitrates, which were detected in 19 Member States (Figure 13-a). In contrast, 14 Member States reported trend reversals for 65 pollutants (Figure 13-b), mainly nitrates, ammonium, sulphates and chlorides.

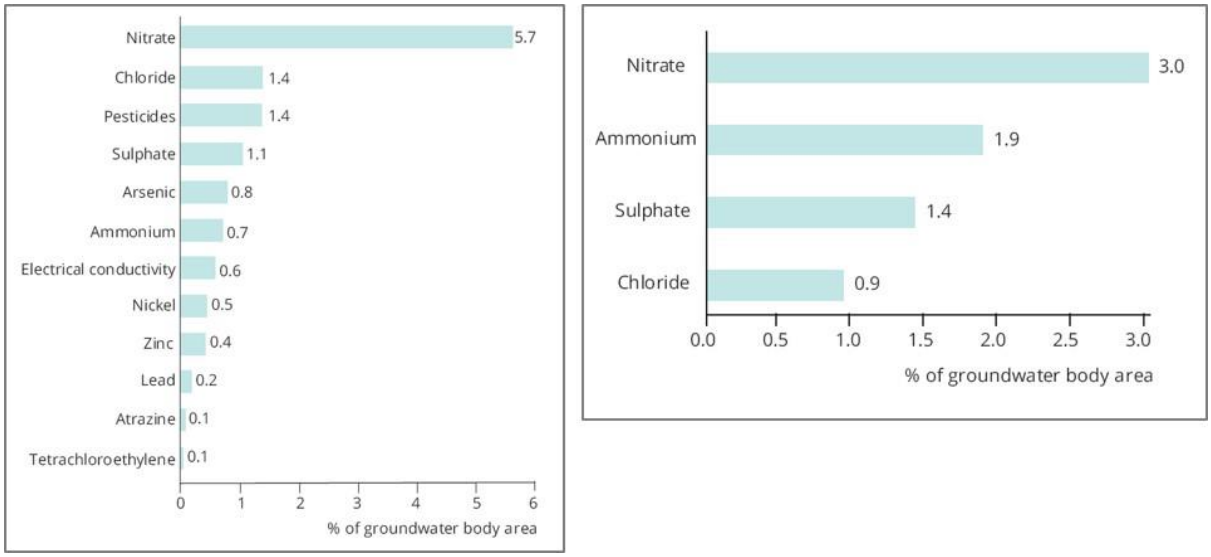


Figure 13: Pollutants with an upward trend (a) and trend reversal (b) by area of groundwater bodies (Source: EEA (2018) State of European Waters)

European Environment Agency data show that there has been a trend reversal in 2007 in nitrate concentrations in groundwater, moving towards the 1992 level (see Figure 14). These improvements are the result of measures to reduce nitrate emissions from agriculture and of improvements in waste water treatment. This is a significant achievement given that the comparatively long residence time of groundwater may cause delays in recovery, in the order of years to decades, between applying nutrient control measures and observing measurable improvements in water quality.

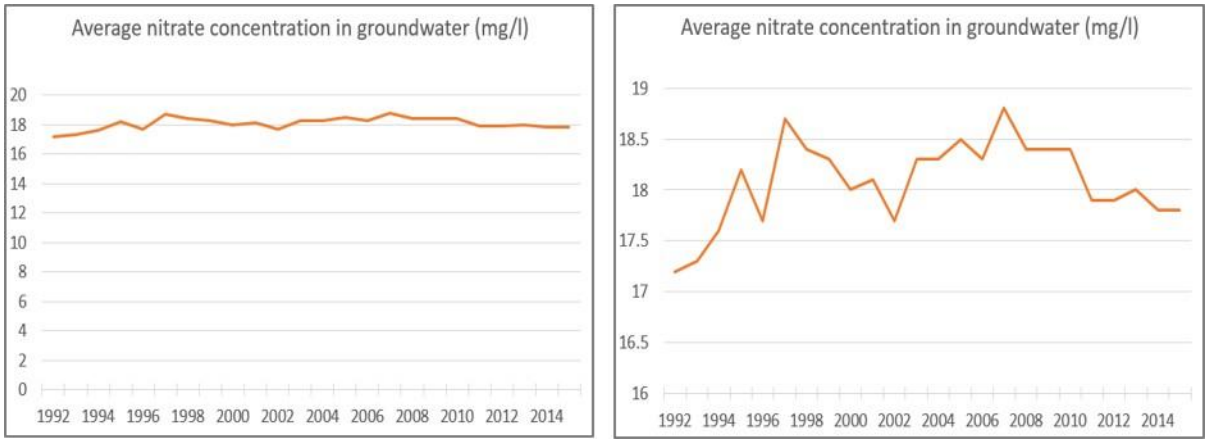


Figure 14: Nutrient trends in groundwater (nitrates), 1995-2015) (Source: EEA)

Increased knowledge of pollutants

In terms of governance, the GWD has significantly contributed to the increased monitoring of groundwater pollutants. Before the WFD, there was no requirement at EU level to monitor diffuse pollution of groundwater, aside from groundwater monitoring under the Nitrates Directive[60]. One concrete example is atrazine, a herbicide whose use is no longer allowed in the EU, and which is also listed as a priority substance. It moves quickly through soil but decays only slowly in water, so its concentrations rose steadily in groundwater, continuing even after its use was banned. The problem was identified initially through the monitoring of pesticides in drinking water, but the long-lasting impact of atrazine use was revealed thanks to the GWD's monitoring requirements.

Challenges

Large variability in the number of pollutants identified by Member States as posing a risk to groundwater bodies

Annex II to the GWD includes a minimum list of pollutants for which Member States have to consider setting threshold values. These have to be set for 'all pollutants which characterise bodies of groundwater as being at risk'. This list identifies the minimum pollutants (9 substances and 1 parameter), and it is up to Member States to identify all other pollutants which may cause risk. This flexibility, which is justified by the different conditions in groundwater bodies all over the EU, has led to significant differences in the number of substances considered, from less than 10 in one Member State to more than 90 in others.

A voluntary initiative of several Member States, taken under the common implementation strategy, is setting up a voluntary watch list[61]. This ongoing process aims to: (i) increase the availability of monitoring data on substances posing a risk or potential risk to groundwater bodies (including pollutants of emerging concern); and (ii) facilitate the identification of substances for which quality standards or 'threshold values' should be set. This voluntary process could in future support the selection of substances for which quality standards or threshold values need to be established.

Similarly to the challenges in surface water, the process of gathering data and producing a watch list can be time consuming, and data gaps make implementing the agreed methodology

[60] Council Directive 91/676/EEC.
[61] As acknowledged by Commission Directive 2014/80/EU of 20 June 2014 amending Annex II to the GWD.

a complex task (e.g. toxicity and eco-toxicity information is often lacking for emerging pollutants). Nevertheless, two pilot studies have already been developed on per- and poly-fluoroalkyl substances (PFAs) and the most commonly found pharmaceuticals[62] to guide Member States and support stetting monitoring priorities.

Large variability in the threshold values

There is also a large variability in the ranges of threshold values across the EU. Some of these variations are logical, as they depend on different natural background levels that depend on the geological nature of the area, but others depend exclusively on the methodologies used to set the threshold values.

Table 2 provides an overview of the range of threshold values of pollutants/indicators for which at least 10 Member States have established threshold values. It shows that the values differ by a factor of 1 to 50. During the public consultation, several Member State representatives and NGOs expressed their preference for increasing the number of pollutants in Annex I, with a view to achieving more harmonisation.

Substance	Number of MS	From	To	Unit
Chloride	15	100	350	mg/l
Arsenic	17	5	20	µg/l
Ammonium	16	0.2	2	mg/l
Cadmium	17	2	20	µg/l
Tetrachloroethylene	12	1	50	µg/l
Trichloroethylene	12	1	50	µg/l
Sum of Tetrachloroethylene and Trichloroethylene	14	7.5	10	µg/l

Table 2: Pollutants/indicators for which at least 10 Member States have established threshold values, including the range threshold values (Source: European Commission[63])

The last update of the Directive (2014/80/EU) only entered into force in 2016. The update partly addressed this issue, as it requested that Member States provide additional information on the setting of the threshold values. Efforts are also ongoing at technical level within the CIS Working Group on Groundwater to collect additional information on how threshold values are set by Member States. Overall, inputs from NGOs to the consultation and views expressed in the Groundwater Directive focus group suggest that more time is needed to assess whether the parameters included in the GWD Annexes are sufficient and what additional efforts are needed to better harmonise threshold values.

The Floods Directive

As Member States are still in the first implementation period for the Floods Directive (2016-2021), there is no information yet on the state of implementation of measures included in the first FRMPs or on the degree of flood risk reduction that has been achieved. This information will only be available after 2022, when Member States will publish their second FRMPs.

[62] Amec Foster Wheeler (2016).
[63] CIS (2019) Technical Report; see also European Commission — C(2010) 1096 and SEC(2010) 166.

Nonetheless, during the focus group discussions Member State representatives confirmed that so far the Directive is working as intended, with the flexibility and framework of the Directive helping them to work together, communicate with the public and understand risk concepts[64]. According to the European Environment Agency, the Directive is possibly the most advanced flood protection and preparedness legislation worldwide[65]. It has led all Member States to take action concurrently, under the same framework, to prevent or reduce social, economic and environmental damage from flood risk[66].

The Commission's assessment report of the first FRMPs found that all Member States have set objectives and that most Member States have put in place a monitoring system. At the same time, the Commission's report found that in several Member States there is still scope to better detail the objectives and explain more clearly how the chosen measures will be effective in achieving these objectives.

5.1.2: 'How have the Directives changed water management practices and influenced governance and policy-making in Member States?'

Overall response:

The Directives have changed water management in the Member States. The Water Framework Directive introduced the principle of integrated water management, addressing aquatic ecosystems as a whole. To protect and restore ecosystems as a whole, integrated water management requires an in-depth understanding of river basins. The WFD's governance mechanisms provide for monitoring and public participation to guarantee evidence-based policy-making. The increased understanding and knowledge that result from the preparation of the RBMPs and FRMPs and from the sharing of good practices between Member States have led to increased implementation of concrete measures on the ground.

Because river basins' natural and socioeconomic conditions differ from each other, the WFD introduced the organisation of water governance based on river basins (i.e. natural boundaries) rather than administrative or national borders, in line with the principle of subsidiarity. Consequently, Member States have set up many river basin authorities and increased public and stakeholder participation in management planning. Finally, given that almost all Member States share river basins, the WFD also provides for international cooperation, which has become stronger as a result. However, for both the WFD and the Floods Directive, cross-sectoral and cross-border cooperation are not yet carried out to the fullest.

The Floods Directive substantially changed the way floods are dealt with, moving from a local protection approach to comprehensive flood risk management based on prevention, preparedness and protection. It introduced governance structures and processes similar to those of the WFD. As a result, in many river basins, the authorities are identical and RBMPs and FRMPs drawn up in coordination.

[64] Trinomics and Wood (2019).
[65] EEA report 1/2013.
[66] EEA report 1/2016.

Integrated water management: taking into account the complexity of ecosystems to enable effective water management

The Water Framework Directive's governance mechanism is based on integrated water management, to enable effective and efficient protection and restoration of Europe's waters. Even though the traditional management practices predicated upon the command-and-control paradigm have been effective and have enabled developed industrial societies to address the most serious health-threatening environmental impacts, they are less suitable for addressing complex environmental problems caused by multiple stressors. This is because the traditional command-and-control approaches consider pressures in isolation and reduce environmental systems to their constituent elements without taking into account the interdependencies and the integrity of the ecosystem as a whole[67]. An additional comment to the public consultation from an energy industry representative acknowledged that the WFD's systemic approach has proven beneficial.

The WFD's governance mechanism is therefore designed in such a manner that it enables Member States to address aquatic ecosystems as a whole, set up management plans based on river basins, collaborate across borders and bring together all the relevant knowledge and analyses.

Water management targeting the ecosystem as a whole

One of the most innovative aspects of the WFD is to base management decisions on the ecological effects of pollution rather than on pollution itself, acknowledging that sensitivity and resilience to pollution vary substantially across ecosystems[68]. Rather than defining 'good status' of waters merely based on the absence of pollutants, the WFD aims to protect and restore ecosystems as a whole, by requiring that waters also have good *ecological* status. This means that the water needs to have sufficient quality to sustain 'life' (fauna and flora) at a level comparable to what would exist in the absence of anthropogenic pressures. Ecological status is measured by 'biological quality elements' such as fish, invertebrates, macrophytes, phytobenthos and phytoplankton.

Apart from the absence of pollutants, fauna and flora also depend on physico-chemical elements such as temperature, nutrients, acidification and dissolved oxygen, as well as on hydromorphology. These are therefore included in the assessment of ecological status as 'supporting elements'.

Hydromorphology is a pressure that on average affects 40% of the EU's surface waters. Changes in the hydrology and morphology of surface waters (e.g. dams, straightening and channelling of rivers, etc.) have been and are being introduced to allow for expansion of urban areas and agriculture, to produce energy or to ensure flood protection. They generally have a large impact on ecosystems, e.g. by eliminating migration routes for fish or destroying spawning areas. Many dams and other barriers are obsolete and can be removed. Degradation of riparian areas may cause a loss of their capacity to prevent pollutants from entering the water streams. Measures such as re-meandering of rivers which were straightened in the past slow down flow velocity significantly, which can increase water retention in the soil, help control the risk of floods, allow for the re-creation of spawning areas for fish and generally contribute to the development of biodiversity in the riparian areas.

[67] Voulvoulis et al (2017).
[68] Hering et al (2010).

River basin-based governance

The WFD introduced water governance based on river basins (i.e. natural boundaries) rather than on administrative or national borders. This is because river basins differ from each other both in their natural and socioeconomic conditions and because the status of water bodies downstream depends on appropriate measures being taken upstream, in line with the principle of subsidiarity. As a consequence, all Member States have adapted their administrative and governance systems: some Member States have established specific river basin district authorities, while several others have adapted existing water administrations to ensure better implementation.

Transboundary cooperation

A part of this new approach to the governance of river basin management introduced by the WFD is the legal requirement for transboundary cooperation. This is important because all Member States except Cyprus and Malta share international river basins (60% of the EU's territory). Under the WFD, a river basin covering the territory of more than one Member State must be designated as an international river basin district, and the Member States concerned must together ensure coordination with a view to producing a single RBMP. Even if there is quite some variation in the implementation practices in Member States or regions, the Commission's latest implementation report found that the WFD has generally strengthened cooperation among Member States and with third countries on water management in shared river basins. Governance structures have been improved and further formalised, while RBMPs and the approaches developed in response to pressures have become more joined up. Overall, the implementation report found that the stronger the governance of the basin and the more developed the RBMP, the better the results in terms of achieving WFD objectives. Nonetheless, the Commission's implementation report also found that there is still some room for improvement, for example on ensuring a harmonised approach for status assessment or the coordination of programmes of measures. The increased exchange of information between Member States is also seen as an important achievement of the Floods Directive.

Evidence-based policy-making

Integrated water management requires in-depth understanding of river basins. This is why the WFD adopted the 'drivers-pressures-state-impacts-responses' (DPSIR) framework, which aims to provide a systemic understanding of the relationship between environmental effects, their causes and measures taken. To gather all the evidence and knowledge needed to deliver the programme of measures (i.e. responses), the WFD requires Member States to:

- undertake an assessment of drivers and pressures affecting the water environment and carry out an economic analysis of water uses (Article 5);
- establish monitoring programmes to ensure that the state of the water environment is known (Article 8); and
- encourage active involvement of all interested parties (Article 14).

Monitoring

In traditional environmental management approaches, monitoring is mostly used to enforce and monitor compliance. By contrast, the Water Framework Directive gives monitoring a much more prominent and functional role, using it to provide a clear and comprehensive overview of the status and pressures within each river basin district. While some Member

States already had monitoring networks in place, the WFD has led to a number of innovations on monitoring, including the monitoring of all types of water bodies, the monitoring of biological elements and the use of a cost-effective, targeted approach (see also Section 5.2.3).

First, the WFD requires the monitoring of all types of water bodies. Member States which already carried out some monitoring prior to the WFD tended to focus on rivers, but often did not monitor lakes and coastal waters[69]. The GWD has significantly contributed to the increased monitoring of groundwater pollutants. Aside from groundwater monitoring under the Nitrates Directive[70], there was no EU requirement to monitor the diffuse pollution of groundwater, even though this had been a known issue since the 1960s. As a result, the level of knowledge of groundwater was weak and patchy[71]. Second, the WFD introduced a more holistic concept of monitoring, which also includes the monitoring of biota and sediments. This innovative monitoring method makes it possible to detect long-term effects as well as very small amounts of pollutants accumulating in the food chain or binding to sediments.

The tangible results of this monitoring approach are discussed further in detail in Section 5.1.3, while the fitness of the monitoring requirements is discussed in Section 5.2.3.

Public participation

Integrated water management requires expertise on a wide range of disciplines, ranging from hydrology, hydraulics, ecology, chemistry, soil sciences, to technology, engineering and economics. In some cases, local stakeholders also hold specific knowledge of the ecosystem at stake that is not always available to water managers. This is why the WFD introduced a requirement to seek the active involvement of all interested parties. As a consequence, Member States have opted, in addition to the formal public consultation processes required by the WFD, to set up a broad range of consultation activities from the national to the sub-basin scale, ranging from water councils or water management boards to round-table discussions on specific topics. Representatives from industry indicated in the public consultation that the WFD's water governance approach, in which all relevant stakeholders are included, has contributed to providing a more complete picture of the status of water bodies in Europe and is a good basis for further improvement (see also Section 5.2.4).

The Commission's latest implementation report showed that Member States have made considerable efforts to improve public consultation and strengthen the active involvement of stakeholders. In almost all Member States, a broad range of stakeholder groups were actively involved, in particular NGOs and nature protection groups, local and regional authorities, and representatives from industry and the water supply and sanitation sector. These efforts have led to tangible results. Several Member States made changes, for example, to the methodologies or made other changes such as: (i) adding new river water bodies; (ii) better coordination of policies and finance; (iii) integration of RBMPs in regional programmes; and (iv) improved linkages with flood risk management plans. Several Member States also made commitments on further research and on action to be taken in the next cycle. Another advantage of the WFD's public participation requirements is that they can increase local ownership. Research has shown that when local communities and business become aware of the specific benefits from good water conditions (e.g. recreation and health, water security),

[69] Collins et al (2012).
[70] Council Directive 91/676/EEC.
[71] Trinomics and Wood (2019).

they are more likely to embed in their own agenda actions that support the WFD objectives (e.g. river restoration, water reuse[72]).

Examples of governance changes and implementation measures

Even if there is as yet no visible impact on the status of water bodies, the increased understanding and knowledge that result from the preparation of the RBMPs and FRMPs and from the sharing of good practices between Member States has led to increased implementation of concrete measures on the ground. A recent study on how Member States have used the DPSIR framework to develop the second RBMPs has demonstrated in detail how Member States have changed their governance systems to address challenges related to nutrients, chemicals, hydromorphology and abstraction[73]. Examples include: (i) revisions of the permitting procedures; (ii) measures to better manage pesticides (e.g. a 'pesticide passport' in Czechia and a pesticide tax in Denmark); and (iii) the establishment of water accounts to keep water managers informed on water stocks and flows. Another example is Estonia's Water Act of 2009, which made it mandatory to guarantee fish passage on barriers in water basins with migratory fish. Although this requirement was made discretionary in 2016, many new fish passes have been installed over the last 10 years thanks to the regulatory requirement to consider fish passage[74]. A report from an environmental NGO similarly presents concrete examples of how the WFD has made a difference in some Member States with regard to agriculture, hydropower, navigation, nature-based solutions, waste water treatment and water pricing[75].

The improved implementation of water pricing and volumetric charging is also a concrete measure that can be attributed to the Water Framework Directive. While its potential as a source of revenues is addressed in Section 5.2.1, water pricing alone is unlikely to be sufficient to ensure sustainable water management and water efficiency. Indeed, because the price elasticity of demand for water is relatively low, the impact of water pricing on water demand can be relatively limited, even though a recent study from the European Environment Agency indicates that households facing a water price increase do react by reducing their water consumption[76]. Nonetheless, the same study finds that water efficiency is best achieved through a combination of pricing and non-pricing instruments. Research shows that if all domestic water-using products were covered by the Ecodesign Directive, a 19.6% reduction in EU total public supply could be achieved (around 10% if only energy-related products were included, excluding dishwashers and washing machines). This would correspond to a 3.2% reduction in the EU's total annual abstraction volume[77].

Floods Directive

The Floods Directive has also substantially changed the governance of floods compared to the situation before the Directive's introduction: as opposed to thinking narrowly in 'local flood protection' terms, the Directive installed a framework that enables more comprehensive flood risk management. More specifically, the Floods Directive has ensured that responsibility is allocated to specific authorities, while at the same time covering the entire catchment area. Its integrated approach includes prevention, preparedness and protection.

[72] Pistocchi et al (2019).
[73] Wood (2019).
[74] Wood (2019).
[75] WWF (2018).
[76] EEA briefing 4 July 2017.
[77] Bio Intelligence Service and Cranfield University (2009).

This is important because, as the EEA points, out a single weak point in the system, which otherwise may consist of many excellent elements, may render the overall system performance unsatisfactory[78]. Asked about the positive impacts of the Directive in the 2016 survey[79], flood risk managers from 13 Member States pointed to the strengthened coordination and collaboration between different sectors, decision-makers and other stakeholders. They also found that cooperation at cross-border basins/coasts has improved since the Directive's introduction.

One concrete achievement of the Directive is that it has significantly improved the availability of information about flood risks, which will lead to increased flood risk awareness. Article 6 of the Directive requires Member States to prepare flood hazard and flood risk maps (at river basin level and at the most appropriate scale) for areas of potential significant flood risk[80]. Flood hazard maps must show the geographical area which could be flooded under different scenarios (Article 6.3), whereas flood risk maps must show the potential adverse consequences of these flood scenarios (Article 6.5). Figure 15 shows an example of such a flood risk map in Romania.

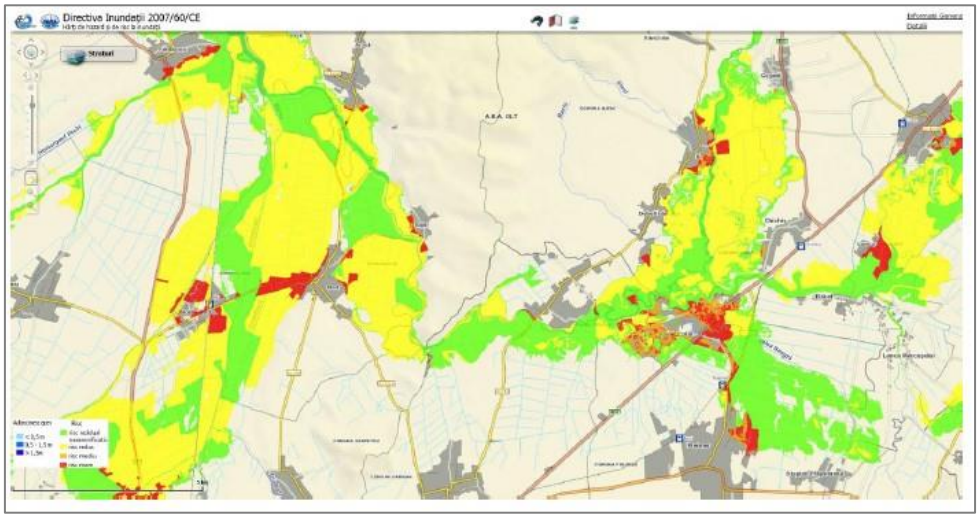


Figure 15: Example of a flood risk map from Romania (green = low risk, yellow = reduced risk, orange = medium risk, red = high risk)[81]

5.1.3: 'Which main factors have contributed to or stood in the way of achieving the Directives' objectives?'

Overall response:

Factors that have contributed to the effectiveness of the Directives in progressing towards their objectives include: (i) the list of priority substances; (ii) the (binding) cross-references to the Water Framework Directive's objectives in other EU policies; (iii) EU funding; (iv) the widely

[78] EEA report 1/2013.

[79] https://circabc.europa.eu/ui/group/9ab5926d-bed4-4322-9aa7-9964bbe8312d/library/ec110327-9521-468f-b6b8-cc32b1245c3c?p=1&n=10&sort=modified_DESC

[80] Identified under Article 5 or 13(1)(a), or for the areas for which Member States decided to prepare flood maps in accordance with Article 13(1)(b).

[81] https://ec.europa.eu/environment/water/flood_risk/pdf/MS%20examples.pdf

applicable non-deterioration principle; and (v) the Directives' monitoring requirements.

The WFD has generated a significant body of data, knowledge and expertise through its requirements for analysis and monitoring, which has in turn facilitated implementation. The dedicated implementation structure set up by Member States and the Commission (the common implementation strategy) has in turn significantly contributed to the EU-wide harmonisation of methodologies and the exchange of good practices through the development of extensive guidance, including for the Floods Directive.

However, overall, the level of effort needed from the different authorities and economic sectors, including the technical knowledge required to harmonise standards and set up governance structures, has been underestimated. Furthermore, there is a need to tackle legacy pollution and when measures are implemented it takes time for ecosystems to recover.

Furthermore, for the WFD and its daughter directives, effective implementation has been hampered by: (i) the extensive use of exemptions; (ii) the lack of prioritisation of the measures to achieve good water status versus other economic activities; and (iii) the resulting lack of allocation of sufficient financial resources in Member States. The Directives' effectiveness is further hampered by the tendency to focus on (mandatory) basic measures only, without using a systems understanding required for integrated river basin management, and by insufficient use of voluntary supplementary measures to reach good status. Although at an earlier stage of implementation, a lack of funding is quite likely to also have an impact on the implementation of the Floods Directive.

Enforceability is hampered by the Directives' complexity, which is a consequence of the flexibility provided to adapt water management to location-specific conditions. Furthermore, there are today still some gaps at national level in the mechanisms to ensure appropriate controls, enforcement procedures and access to justice for civil organisations and individual citizens. In some cases, there is no system of inspections or effective system of penalties in place.

An EU-wide framework

The setting of EU-wide requirements for the quality and quantity of water bodies has led to various concrete measures to improve the situation and has contributed to creating a level playing field. When respondents to the public consultation indicated which factors contributed most to achieving the Directives' objectives, the three factors rated most widely as 'substantially' achieving the objectives were the planning approach based on river basin districts (53%, n= 687), the monitoring requirements (39%, n=680) and the setting of quality standards for pollutants at EU level (41%, n=675[82]).

Binding cross-references included in other EU policies

As a framework directive, the WFD sets objectives that are taken into account in other EU legislation. An explicit obligation to consider the WFD's objectives features in, for example, the Biocidal Products Regulation, the Plant Protection Products Regulation, the Sustainable Use of Pesticides Directive, the Industrial Emissions Directive, the Urban Waste Water Treatment Directive and REACH. Likewise, the GWD quality standards need to be taken into account for the authorisation and use of pesticides.

[82] For each of the three factors discussed above, the most common groups of respondents indicating 'substantially' were EU citizens (33%, 34% and 37% respectively) and industry representatives (29%, 28% and 22% respectively).

One reason for the effectiveness of the Environmental Quality Standards Directive in relation to metals is the close link between the WFD and the Industrial Emissions Directive (IED), under which emission limit values[83] have been set to ensure that the EQSs set under the WFD are met. France provides a concrete example of how this has been implemented successfully. There, the need to comply with the WFD and the EQSD led to the development of a national action plan for research and the reduction of releases of hazardous substances in water from classified installations (for environmental protection). This national plan further strengthens the link between the WFD and EQSD on the one hand, and the IED on the other. Similarly, Sweden recently concluded that it needs to introduce advanced treatment for pharmaceutical residues in waste water treatment in order to comply with the WFD and the EQSD.

Coherence with other EU policies is discussed in further detail in Section 5.3.2.

EU funding

About 65% of all river basin districts indicated having received support through EU funding in the first RBMP, through various funding instruments such as the LIFE programme, the European Structural and Investment Funds, Horizon 2020 and the common agricultural policy. This is discussed in more detail in Section 5.3.2.

Widely applicable objectives

The WFD leaves a considerable degree of flexibility and policy discretion to the Member States when implementing the Directive. However, the Court of Justice of the European Union has clarified in the Weser ruling (C-461/13, see text box) that the WFD's environmental objectives, and in particular the non-deterioration objective, are not merely objectives for management planning, but also apply to individual projects[84]. Its scope is therefore widely applicable.

The Weser ruling

The case concerns a planning decision to deepen the Weser river in northern Germany, which was challenged by an environmental NGO. Despite the project's significant negative effects, such as disposal of the dredged materials and increased salinity in parts of the lower Weser, the authorities concluded that deterioration of the river's status was not expected because the river's overall ecological status would not decrease.

The Court ruled that Member States must not authorise projects which may cause a deterioration of the status of a surface water body unless it is possible to grant a derogation under Article 4(7) of the Directive, subject to the conditions set out in it[85]. Further, the Court held that there is deterioration as soon as the status of at least one of the quality elements determining the status of the water body falls by one class, even if that fall does not result in a fall in classification of the body of surface water as a whole[86].

[83] Emission levels associated with the use of best available techniques (BAT AELs).

[84] I.e. the Court ruled that Articles 3, 5, 8, 11, 13 and Annex V are interconnected and serve to enable the Member States to implement measures in order to prevent deterioration and ensure a good status of all water bodies, as set out in Article 4(1).

[85] Conditions relate to reasons justifying the derogation, such as: (i) overriding public interest/benefits to human health; (ii) safety or sustainable development outweighing benefits of achieving the objectives of WFD; and (iii) absence of less costly technical solutions and the need for appropriate mitigation measures.

[86] Where the water body is already in the lowest class, any deterioration of the quality element causing the body to be in that class will be considered 'deterioration'.

The ruling confirmed the balanced approach of the WFD, which establishes a framework for the sustainable management of water by providing mechanisms to balance economic development dependent on water and the protection of water resources and the ecosystems linked to it. The Court argued that the effectiveness of the Directive would be seriously hampered if the non-deterioration requirement meant that there is only deterioration if the water body as a whole were to drop to a lower status class[87]. On the other hand, the one-out-all-out approach is not as strict as it may seem, as not every small decline of one of the quality elements causes a deterioration in class, since classes are defined as 'ranges[88]'.

Some stakeholders, mainly representatives from industry and the hydropower sector, raised concerns during the consultation about the application of the Weser case, which is seen as having led to uncertainty and excessive precaution in the permit schemes in some Member States. The concerns relate to the assessment of deterioration at quality element level, which is seen as too stringent, as compared to considering deterioration in overall status. Some industry representatives also expressed concerns about the limited scope of, and restrictive conditions for, the exemption laid down by Article 4(7). They view these as too restrictive in that the exemption only allows for deterioration as a result of new modifications to the physical characteristics of water bodies or as a result of new 'sustainable human development activities', which is applicable for deterioration from high to good status only. This implies that in all other cases, for instance deterioration of chemical status as a result of new activities, there is no possibility for derogations.

Increased knowledge

More data, knowledge and expertise

In its 2012 State of Water report, the EEA confirmed that '[…] compared to the situation before the WFD, there has been a significant improvement of the knowledge base (supported by many EU research projects over successive Framework Programmes) and increased transparency by bringing together information on all characteristics, pressures and impacts on water bodies at basin level[89]'. As discussed in Sections 5.1.1 and 5.1.2, the WFD requirement for adequate characterisation of the status of water bodies has led to the Member States developing extensive monitoring networks and scientific methodologies for status classification. This is important for example with regard to mercury. Understanding spatial and temporal trends for mercury is crucial in assessing measures taken both at European and at global level. It is only by understanding the movement and interaction of mercury within our environment that this persistent problem can be tackled.

In concrete terms, this means that for the second RBMPs the status of European waters has been monitored in more than 130,000 sites. This has led to a significant reduction in the number of water bodies with 'unknown status' and an increase in the confidence of the status assessment. Comparing the first and second RBMPs, the number of water bodies in unknown status went from 16% to 4% of the total for ecological status, and from 39% to 16% of the

[87] Such interpretation would not be effective, as it would imply that where the water body is already in a certain class as a result of one of the quality elements being in that class, this would imply that all other elements could be reduced without this having legal consequences. In addition, researchers (e.g. Hering et al, 2010) point out the importance for biodiversity of water bodies in high status, noting that water bodies with high status are characterised by species richness and the number of sensitive species for which they provide a habitat.
[88] van Rijswick et al (2015).
[89] EEA report 8/2012.

total for chemical status[90]. This is not an insignificant achievement given that in the 1990s even for rivers, only half of the European countries were assessing biological parameters in addition to physiochemical monitoring[91]. As one group of researchers puts it: 'One major obstacle was that no consistent biological datasets were generally available for lakes, rivers and coastal waters. A major achievement of the WFD is that many sampling and analysis procedures have been standardised across Europe, there has been taxonomic training and extensive monitoring programmes including physical, chemical and biological variables have been implemented[92]'.

The increased knowledge is not limited to the results from monitoring and reporting. A critical reading of the second RBMPs also shows that Member States have greatly increased their technical knowledge about water management, with examples ranging from improved insight into the cost-effectiveness of measures, to modelling tools to assess the gap to compliance, and to improved understanding of environmental costs[93]. Likewise, the adoption of the Floods Directive has stimulated the use and further development of available technologies in flood risk management, such as one dimensional, 2D, or even 3D hydraulic modelling for assessing flood risk. The visualisation of the potential flood extent and depth through geographical information systems is another example, which requires the existence of an accurate digital terrain model. The 2016 survey showed that in many Member States, these digital terrain models had been created or significantly updated, while digital inundation maps were introduced or significantly updated after the introduction of the FD. Finally, with respect to innovation and technology development, the European Innovation Partnership on Water[94], set up by the Commission, has also contributed to sharing good practice.

Common implementation strategy: harmonisation of methodologies and exchange of good practices

Another factor that has positively influenced the implementation of the EU's water *acquis* is the work under the common implementation strategy (CIS), which has significantly contributed to improving the knowledge base. Work under the CIS has resulted in the adoption of a considerable number of guidance documents on technical aspects, which are seen as providing significant support for the Directives' implementation. Even if the guidance documents are non-binding and their development is relatively resource-intensive, the overall results are positive and include harmonised methodologies, improved understanding, and exchange of information and good practice, leading to better implementation.

[90] In the second cycle of RBMPs, Member States reported, for the water bodies and quality elements for which the classification had changed since the first RBMPs, whether the change was a real one or was due to improved methodology, improved monitoring, or both. For example, Germany reported that the changes observed for the quality element macrophytes were in almost 50% of the cases due to improvements in monitoring and/or methodologies. Although there are large variations, this effect of improved knowledge makes comparisons between the status in the first and second RBMP cycles very difficult.
[91] Birk et al (2012).
[92] Hering et al (2010).
[93] See e.g. Wood (2019).
[94] https://www.eip-water.eu/

Common implementation strategy guidance documents

Guidance Document No 31 on ecological flows [95] is a concrete example of where the CIS has been useful in helping Member States to implement the WFD. It provides guidance on establishing coherent rules on setting the flow regimes that have to be maintained in order to safeguard ecosystems downstream of large infrastructures such as dams. Another example is Guidance Document No 36 on Art 4(7) exemptions[96], which clarifies the steps that need to be taken if a new project risks causing a deterioration in the status of a water body (how to assess deterioration, extent of justification, mitigation). Many Member States have transposed the guidance or implemented it, in particular in relation to (small) hydropower projects (e.g. in Italy, Slovenia, Bulgaria, Slovakia and Romania). However, it could be argued that the limitations of the CIS process become evident on issues that are absent from the text of the WFD, for instance the wide but not full coverage by Member States of measures suggested in Common Implementation Guidance No 24 'River Basin Management in a changing climate' from 2009. For example, according to the latest implementation report, climate checks of the programmes of measures are still not carried out in six Member States, and penetration rates of other suggested adaptation measures range from 31% (forecasting the economics of water supply and demand) to 78% (flood risk management) of the RBDs.

Underestimation of efforts needed

Setting-up of the governance framework and harmonisation of standards

Intercalibration

Implementing the WFD has taken longer than expected. One reason for this is that more resources than anticipated were needed to make the changes necessary to: (i) set up an integrated water management governance framework that accommodates subsidiarity (see also Section 5.1.2); and (ii) harmonise the standards used by different Member States. A concrete example is the 'intercalibration exercise', the process needed to harmonise standards for ecological status across the EU (see text box below). Intercalibration required a a major effort and was one of the reasons for the delay in the publication of the first RBMPs. Nevertheless, researchers regard intercalibration as something that other policy areas or third countries forming transboundary river basins can benefit from[97], given that the comparability of sampling and analytical practices is a challenge in many fields. Intercalibration is said to have 'engendered more collaboration and capacity building between scientists and managers responsible for surface water monitoring and assessment than could have been possibly imagined'[98] and to be a 'major achievement' that has led to 'a new understanding of applied aquatic ecology'[99].

Intercalibration of ecological assessment methods

Water body types differ not only in terms of size, climatic conditions and catchment geology, but also in the species that inhabit them. Furthermore, stressors affecting aquatic ecosystems differ among regions, and the effects of different stressors (e.g. acidification or eutrophication) cannot be assessed with the same metrics. In addition, sampling methods and knowledge on the taxa differed, so uniform taxonomy-based assessment methods could not account for all these differences to be

[95] https://circabc.europa.eu/sd/a/4063d635-957b-4b6f-bfd4-b51b0acb2570/Guidance%20No%2031%20-%20Ecological%20flows%20%28final%20version%29.pdf
[96] N° 36 — Article 4(7) Exemptions to the Environmental Objectives
[97] Poikane et al (2014).
[98] Birk et al (2013).
[99] Hering et al (2010).

applicable throughout Europe. In line with the subsidiarity principle, the WFD indicates which characteristics of the biological quality elements should be assessed (e.g. 'abundance', 'community composition'), but does not specify which indices or metrics should be used.

The purpose of intercalibration was thus to make sure that a water body classified with good status in Member State X following the methods of Member State X would also be classified with good status by Member State Y if following the methods of Member State Y[100]. This was a rather challenging exercise, particularly as existing methods differed significantly, because experts were unwilling to change them, or because some Member States did not have any methods in place at all.

Setting up the integrated water management governance framework

Similarly, Member States underestimated the level of effort needed to implement the Directive. This included administrative resources, technical expertise and sufficient funding, especially in the period immediately after the adoption of the WFD and during the first management cycle. The characterisation of river basins, due by 2004 (including analysis of pressures, impacts and economic analysis), proved to be a challenge for many Member States. The quality of the information provided and the level of detail varied considerably. Most Member States managed to establish monitoring networks for both surface and ground water by 2006 as expected, but significant gaps in some river basin districts, for some water categories and for some quality elements or chemical pollutants were present at the time and some of those gaps remain almost 20 years after the adoption of the WFD.

The adoption of the first RBMPs also proved to be challenging. Two years after the 2009 deadline, four Member States had still not finalised their RBMPs, and three of them have been condemned by the Court of Justice for this failure[101]. The Commission's latest assessment report, however, found that much progress was made in the second cycle on the characterisation of river basins.

Legacy pollution and the time needed to restore ecosystems

Another reason why the scale of the efforts needed to reach good status was underestimated is that they depend not only on mitigation measures to address current pressures, but also on restoration measures to address pressures from the past. One example are hydromorphological pressures. Surface waters have undergone changes as a result of economic activities for decades. In some river basins, the continuity of rivers is interrupted every second kilometre[102]. EU-funded research projects like AMBER are helping to work out how to cost effectively restore connectivity in waters to restore aquatic biodiversity[103]. Another example is chemical pollution. Chemical pollutants are or have been emitted into water bodies through a range of pathways and from a variety of sources, including industry, agriculture, transport, mining and waste disposal, as well as from our own homes. Significant levels of some priority substances have built up from historical use and this legacy pollution may persist in water bodies long after pollutant discharges and inputs have ended[104].

[100] Birk et al (2013).
[101] European Commission — SWD(2012)393.
[102] EEA report 8/2012.
[103] https://amber.international/about/.
[104] EEA report 18/2018.

Restoration measures to address legacy pollution can be costly, even though the available evidence shows that the benefits outweigh the costs (see Section 5.2.1). Some measures can take a long time before they can be implemented, e.g. to acquire space for restoration of river floodplains. Moreover, where measures are implemented it can take a long time before they take effect. Reduction of phosphorus loads, for example, only leads to a new equilibrium after 10 to 15 years[105]. Likewise, recovery of biotic communities takes many years, sometimes even decades[106].

The one-out-all-out principle

The one-out-all-out principle, which implies that the overall status can only be classified as 'good' if all the elements it is comprised of are at least considered 'good', makes it more difficult to make progress visible. The one-out-all-principle embodies the precautionary principle and ensures that all pressures capable of causing degradation are addressed. In the public consultation, this point was strongly emphasised in the consultation by representatives from industry and agriculture. In contrast, representatives from NGOs and respondents to the campaign emphasised the benefits of maintaining the one-out-all-out principle and the dangers of weakening the 'non-deterioration' requirement[107].

Given the importance of better communicating the progress made to citizens and stakeholders, work is under way to facilitate more detailed communication about the state of water. This approach was adopted in the 2018 European Environment Agency report on the state of water, which showed that there are clear improvements for all of the most commonly used biological quality elements in rivers and for phytoplankton in transitional waters. It also showed that 20% of the EU surface water bodies (about 16,000 water bodies) improved in ecological status/potential class, even if there was no improvement in the percentage of water bodies in good or high status[108]. Further means to ensure transparent communication towards citizens on this should be considered.

Insufficient ambition in the implementation

In addition to the long time lags needed for ecosystems to be restored and the difficulties to communicate progress due to the one-out-all-principle, the benefits of water in good quality and quantity are also not always fully visible and tend to be undervalued by economic actors and policy-makers (see Section 5.2.1). This has probably had an impact on the level of ambition regarding the implementation of the WFD, leading to insufficient and less effective measures in the programmes of measures and insufficient funding, two interlinked problems. Respondents who participated in the campaign find that the lack of political will from governments to deal with the main pressures on freshwater ecosystems is the main challenge to sustainable water management in Europe.

Funding

The lack of funding is currently still a major obstacle to better implementation of the WFD, as concluded in the Commission's most recent implementation report. In the second RBMPs, only 46% of RBDs reported that funding was secured to implement measures in all relevant

[105] Jeppesen et al (2005).
[106] See e.g. Jones et al (2019).
[107] Trinomics and Wood (2019).
[108] EEA Report 7/2018.

sectors, while 17% reported having no financing secured at all. Possible reasons for this include:

- budgetary constraints;
- insufficient implementation of cost recovery and the polluter pays principle (see Section 5.2.1);
- the lack of policy integration (different ministries in charge of implementing measures);
- the insufficient use of cost-benefit analysis;
- the fact that benefits of measures only come at a later stage and do not always generate a cash flow.

Funding is also a challenge in Member States in relation to flood risk management. Although the large majority of the FRMPs assessed identified funding sources for measures, they only made a generic reference rather than making budgetary commitments[109]. In addition, even though the FRMPs are adopted officially in all Member States, they are legally binding in less than half of them, in some cases because of uncertainty over funding of measures. At least three Member States mention in their FRMPs that there might be a shortfall in funding, or that funding is not secured. Reflecting this potentially precarious situation, a recently published European Court of Auditors report[110] recommended that Member States improve the identification of financial resources when they draw up their FRMPs.

Widespread use of exemptions

Given the significant challenges in achieving the WFD's objectives, the Directive includes a safety mechanism that allows Member States to use an exemption to postpone the 2015 deadline or lower the level of ambition. These exemptions require a thorough assessment and justification of all conditions set by the relevant articles. The Commission, Member States and stakeholders have agreed on different guidance documents[111] to ensure a common understanding of these requirements. In practice, however, the use of exemptions, currently applied over half of Europe's water bodies, is often not duly justified in the RBMPs. The justifications tend to be provided in a generic manner, which raises questions on how this would help achieve the WFD's overall objective. The possibilities for exemptions will be reduced after 2027, as time extensions under Article 4(4) can only be authorised in cases where all the measures have been put in place, but the natural conditions are such that the objectives cannot be achieved by 2027.

Programmes of measures are not always based on integrated water management

One of the major obstacles to achieving better results towards the environmental objectives of the WFD is what a group of researchers has described as 'a reductionist implementation of a systems directive[112]', pointing out that in practice the programmes of measures are not always based on the integrated planning approach required under the Directive. This view was confirmed in the Commission's latest implementation report. Based on concrete case studies, researchers found that in some cases there is a tendency to rely on easy technological fixes that address point source pollution, while leaving other sources of pollution largely

[109] Member States' own budgets (at national, regional and local levels) are the most cited source of funding.
[110] European Court of Auditors Special Report 25/2018.
[111] Common Implementation Strategy Guidance No 20 (2009) and Guidance No 36 (2017).
[112] Voulvoulis et al (2017).

untargeted[113]. This leads to ineffective implementation, because the pressures and impacts analysis and monitoring data are key elements that provide the in-depth understanding of the catchment needed to develop programmes of measures targeting the appropriate pressures[114,115].

The management actions in the programmes of measures are also often based on an assumption of linear causality, assuming that easy, rapid ecological status improvements will be achieved by compliance with certain standards for the monitored indicators. This is a missed opportunity because most European waters are exposed to multiple pressures. In other words, if the interlinkages and feedback between pressures are not taken into account, there is a risk that the appropriate mitigation measures will not be identified[116].

The Commission's latest implementation report found that in many cases Member States have only estimated how far existing measures will contribute to achieving the WFD's environmental objectives and have mostly continued with traditional management practices focusing on regulating individual monitored pollutants, rather than planning all the necessary measures to achieve good status. The Commission's fourth implementation report also noted that there is a tendency to focus on (mandatory) basic measures only without the systems understanding required for integrated river basin management. The system of leaving policy discretion to the Member States through voluntary supplementary measures may thus hamper the effectiveness of the Directives.

Some examples of good practice can be found in specialist literature. For example, in the German federal states of Schleswig-Holstein and Thuringia, management decisions have been based on large-scale consideration of ecological status and on the WFD requirements concerning biological quality elements.

Lack of integration into other sectoral policies

Achieving the WFD's environmental objectives is closely linked to and dependent on the full implementation of legislation regulating the sources of pollution, such as the Nitrates Directive and the Urban Waste Water Treatment and Industrial Emissions Directive (see Section 5.3.2). Figure 16 shows a thematic overview of a programme of measures of a river basin district in one Member State. It includes 84 measures, of which 51 are basic measures and 33 are supplementary measures. The different colours indicate the sectors that are targeted. This shows that reaching the Directives' objectives requires the integration of water quality into various policy areas that are beyond the competence of water managers.

In many Member States, the lack of integration of water objectives into other sectoral policies has been a major impediment towards reaching better results. In some cases, certain measures listed in the programme of measures cannot be implemented because the (local) water managers do not have the competence to implement them. Several cases, documented in the academic literature and in the Commission's implementation reports, show that programmes of measures do not include enough measures that target particular environmental problems or

[113] Giaokoumis et al (2019).
[114] Giaokoumis et al (2019).
[115] Also, the assessment of the pressures and impacts has not been sufficient to establish how intensive the use of chemicals has been, e.g. there are no comprehensive data on the quantities of chemicals used and emitted at national and river basin level.
[116] Giaokoumis et al (2019).

only include measures that mainly concern the water management sector[117]. This issue is particularly acute with respect to diffuse pollution, where it is generally impossible to attribute water quality problems to specific polluters or specific water users. This in turn makes enforcement by Member States much more problematic than is the case for point sources of pollution, where the polluter can in most cases be precisely identified.

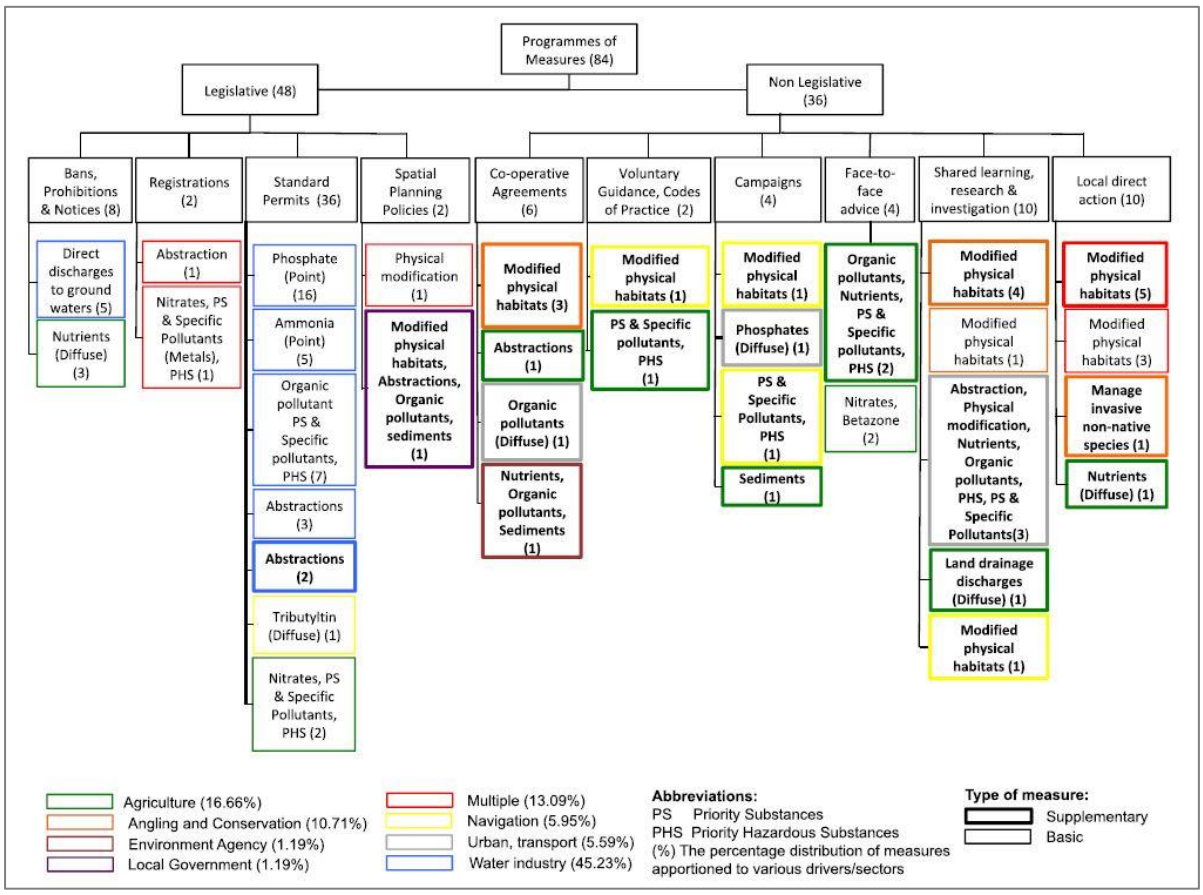


Figure 16: Schematic overview of a programme of measures, presenting measures by type, mechanisms and sectors targeted (Source: Giakoumis et al.[118])

The WFD's coherence with other EU policies is further discussed in Section 5.3.2.

Enforcement

Correct implementation and enforcement is a key factor for the effectiveness of legislation.

Legal action by the European Commission

The correct implementation and legal enforcement of the Directives, as transposed into national law, is in the first place the responsibility of the Member States, who have a key role in ensuring the objectives of the Directives are reached. Nonetheless, the Commission has pursued targeted legal action to enforce the implementation of the Directives covered by this fitness check, as documented in the Commission's implementation reports. Between 2003 and 2017, this led to 20 court rulings[119]. There have also been six preliminary rulings

[117] See e.g. Junier et al (2012).
[118] Giaokoumis et al (2019).
[119] 17 on the Water Framework Directive, 2 on the Floods Directive and 1 on the Groundwater Directive.

addressing issues of interpretation of the Directive[120] and one ruling that arose from an action for annulment[121]. In addition, many cases to enforce the correct transposition and implementation of the Directives have been resolved in the pre-litigation phase, which has also prompted considerable steps forward in terms of correct implementation and enforcement.

The bad application cases, where legal action focuses on deficiencies in the implementation of the correctly transposed national law, can be classified into two main categories (in addition to failure to meet reporting requirements):

(1) Targeted follow-up to the assessment of RBMPs: 10 investigation procedures were initiated based on the first RBMPs. Four remain open, and one was taken forward to the infringement stage. The assessment of the second RBMPs will enable the Commission to identify where further bad application cases should be pursued.

(2) Cases arising from complaints from citizens and NGOs, from parliamentary questions and from petitions[122]: in line with the general policy on the enforcement of EU law, the Commission focused on structural and systemic cases which can make a difference to the overall practices in a particular Member State. Key issues concerned existing or future discharges or abstractions, interpretation of key concepts in the WFD (e.g. 'water services'), and the justifications for exemptions under Article 4, including as regards new modifications having an impact on water status (such as hydropower and navigation projects).

Access to justice and enforcement

Effective national enforcement can only happen if there are sufficient possibilities for access to justice, allowing citizens and organisations to challenge the decisions and actions related to water management. Member States need to guarantee this in accordance with the national law transposing the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. The majority of the respondents (65%, n=555) consider that the WFD and its daughters are not effectively enforced and implemented in their country[123]. This is possibly due to the Directives' complexity, which is a consequence of the flexibility provided to adapt water management to location-specific conditions.

Action by environmental organisations has focused mainly on challenging the permits or authorisations for specific projects, followed by ad hoc investigations into specific cases of serious environmental harm. Environmental organisations have also challenged established environmental quality standards and gaps in the monitoring programmes. For example, civil society action led to a Spanish Supreme Court ruling in 2019[124] on a claim filed by various citizen organisations and small municipalities about the RBMP that covers the Tagus river

[120] If provisions are insufficiently clear to ensure proper enforcement, national courts can raise questions of interpretation before the European Court of Justice. In the case of the Water Framework Directive, this has led to six preliminary rulings (with three other requests ongoing). This is a relatively low number given that it concerns a framework directive. Compare this with the Waste Framework Directive 2008/98/EC, which has led to nine preliminary rulings (with five more requests ongoing).

[121] As retrieved from the database of the Court of Justice of the European Union, which contains 24 ECJ rulings concerning the WFD between 2003 and 2017.

[122] European Commission, COM 2017/C 18/02.

[123] Trinomics and Wood (2019).

[124] Judgments of the Supreme Court, Chamber 3 to, No 339/2019, 14 March 2019 (Rec. 4430/2016).

basin. The ruling held that the RBMP disregards the minimum ecological flow established by the Tagus River Basin Authority in 2010. The ruling required the establishment of ecological flows to avoid the environmental decline of the river and its riparian ecosystems.

According to representatives from civil society, however, the possibilities for individuals and organisations to challenge issues related to the RBMPs or FRMPs differ widely among Member States. Furthermore, where decisions can be challenged, procedures are reported to be excessively lengthy and/or costly, or scarcely implemented in practice[125]. An important case in this respect has been the 'Protect' ruling of 20 December 2017 in case C-644/15, where the Court recognised the right of certain environmental organisations to contest a permitting decision before a national court where the decision may result in deterioration of a water body. This will further strengthen environmental organisations' role in the effective implementation of the Directive.

One NGO that participated in the targeted consultation also cited the issue of judicial compliance mechanisms, claiming that in many Member States there is a critical implementation gap due to the absence of a system of inspections or other checks and of any follow-up of detected non-compliance with obligations in the programmes of measures under Art 11(3) WFD. 48% of respondents (n=42) in the targeted consultation (mostly NGOs, one international river basin district and one competent authority) indicated that they do not find the system of penalties for non-compliance with permit conditions or authorisations to be effective, proportionate and dissuasive.

Towards reaching good status in 2027

By the time the third RBMPs are adopted in 2021, it can be expected that many more of the measures undertaken in the first and second RBMPs will have resulted in positive effects towards good status[126]. Because achieving good status depends on addressing multiple location-specific stressors, which can be done in various ways, it is difficult to estimate at EU level how long it will take to reach compliance. At the same time, there are a number of implementation issues, such as the lack of finance or the insufficient integration of water policy in sectoral policies, that are currently an obstacle to compliance. These issues are common to most Member States.

5.2. Efficiency

The efficiency analysis considers the relationship between the costs of implementing the Directives and the benefits achieved (Sections 5.2.1 and 5.2.2). It also looks into the fitness of the monitoring and reporting requirements (Section 5.2.3) and whether there are any opportunities to simplify the legislation or reduce unnecessary regulatory cost without undermining the Directives' objectives (Section 5.2.4).

5.2.1: 'What are the costs of the legislation and to what extent are the costs of the legislation justified, given the benefits achieved?'

Overall response:

For measures under the Water Framework Directive and its daughters, the costs reported by Member States amount to €13.8 billion. In many cases, however, these costs do not include what is

[125] EEB (2018).
[126] EEA Report 7/2018.

needed to bridge the implementation gap: programmes of measures are often determined by what can be delivered with the budgets and policies that are already in place. For the Floods Directive, the costs of measures reported in the flood risk management plans amount to €12.5 billion between 2016 and 2021.

Implementing Article 9 of the Water Framework Directive on cost recovery and water pricing has so far had mixed results, while exemptions based on disproportionate costs are not always adequately justified. This incomplete implementation deprives Member States of a potential source of revenue to finance measures and translates into a hidden cost to society when the environmental and resource costs are not taken into account. The insufficient contribution from certain water users is an issue that is emphasised by respondents to the campaign organised by environmental organisations in response to the public consultation. Representatives from the water sector also point to the increasing costs of treatment, which are passed on to the consumer rather than being paid for by the polluter. In contrast, representatives of the agricultural sector oppose water pricing and the monetisation of ecosystem services.

Studies on the value of ecosystem services and the restoration of rivers indicate that the benefits of measures to improve the status of water bodies outweigh the costs and that citizens' willingness to pay exceeds current expenditure on water measures. The costs businesses avoid through having water of good quality and in good quantity are also significant. In the public consultation, a large majority of respondents[127] indicated that they find the costs involved in implementing the WFD, GWD, EQSD and FD to be justified given the benefits that will be achieved in the long term.

Costs

Costs reported in the RBMPs

The costs of WFD-specific measures reported by Member States in the second RBMPs are €13.8 billion per year (less than 0.1% of EU GDP). This includes capital investment and operation and maintenance.

To put this number into perspective, two important qualifications should be made. First, these figures include non-recurring capital investments, which should be annualised over a period of several years. A study[128] based on data from the first cycle of RBMPs (which were of the same order of magnitude) found that this means that actual costs are more realistically in the range of €6.5 billion per year. Second, these numbers do not always include the cost of all measures to be taken to close the implementation gap, so these numbers should be seen as an underestimation. Indeed, according to the Commission's fifth implementation report, several Member States planned their measures based on 'what is in place and/or in the pipeline already' and 'what is feasible', without adequately identifying the most appropriate and cost-efficient measures to ensure that their waters achieve 'good status' and adding a price tag to that.

In the public consultation, the majority of respondents indicated that they agree or strongly agree that the costs involved in implementing the WFD (72%), GWD (70%), EQSD (65%) and FD (73%) are justified given the benefits that will be achieved in the long term[129][130].

[127] (72%, n=518, half of which are EU citizens, followed by NGOs, competent authorities and industry associations).
[128] ACTeon (2012).
[129] Trinomics and Wood (2019).

Difficulties with accurately quantifying costs related to the Water Framework Directive

The accurate quantification of costs related to the WFD is challenging, because to reach the objectives Member States need to implement location-specific measures to address a wide range of pressures. Member States are required to report on implementation, but the data available are insufficiently detailed and do not allow for meaningful conclusions to be drawn. In addition, the reported costs need to be put into perspective and are difficult to compare: in order to compare the cost estimates, it is first necessary to take into account variables such as the size and number of water bodies affected and how far they are from reaching good status. However, it is also necessary to consider that certain parameters such as the estimated life span of the measures (30, 40 or 100 years[131]) and the discount rate (4%, 6%, …) may lead to results that are impossible to compare. Differences in costs also partly depend on the extent of monitoring and assessment: if the status of water bodies is not properly monitored and assessed, it is unlikely that the necessary measures will be planned for and implemented. Lower costs are thus not necessarily a sign of more efficient implementation.

Costs to business

Costs to business related to the WFD include: (i) administrative costs; (ii) waste water treatment costs; (iii) taxes and fees for the cost recovery of water services and activities with a significant impact on the environment; and (iv) in certain cases, opportunity costs. Because the WFD is a framework directive, no data can be specifically attributed to it.

The costs of pollution are mostly internalised through the Industrial Emissions Directive and the Urban Waste Water Treatment Directive[132]. A series of studies on the cost of EU regulation carried out for the Commission[133] found that for many industries these costs are small to negligible. Indeed, these studies found that EU legislation has sometimes been a significant driver of environmental protection investments. However, they also found that: (i) in some countries, industry was subject to environmental permitting well before the adoption of even the IPPC Directive; (ii) national regulations were not necessarily less stringent than the emission levels recommended in the BAT[134] reference documents (BREFs); and (iii) operators also find that there are positive effects of BATs on operation plants. The case study below on the costs of implementation in a specific RBD provides further insight into the order of magnitude of the mitigation costs for industry.

In additional comments submitted as part of the public consultation, four respondents from industry and industry associations for Member State and third countries argued that cost-benefit analyses should be carried out more often and that these analyses should also take account of indirect and maintenance costs. Researchers, on the other hand, caution against the excessive use of cost-benefit analysis to inform environmental policy decisions, as not all benefits can be monetised, in particular the benefits from ecosystem services[135]. Several

[130] Of the respondents indicating they agree or strongly agree, most were EU citizens (44%, n=258) — Floods Directive only.
[131] The second implementation report found that only a minority of Member States included depreciation in their calculations.
[132] The IED replaced the IPPC Directive.
[133] https://ec.europa.eu/growth/content/final-report-assessment-cumulative-cost-impact-aluminium-industry-0_en and https://ec.europa.eu/growth/content/cumulative-cost-assessment-cca-eu-ceramics-and-glass-industry-published_en
[134] Best available techniques.
[135] Feuillette et al (2016).

reference works provide guidance on the methodologies that can be used[136], and several Member States have undertaken extensive studies or developed guidelines or databases for citizens and practitioners[137]. Nonetheless, some methodologies can be relatively resource-intensive, which can lead to a trade-off between resources and uncertainty of the results[138].

Costs to agriculture

Costs to agriculture related to the WFD include: (i) administrative costs; (ii) costs related to fertiliser and pesticide management, adjusted feed techniques and sampling, and waste water treatment; (iii) taxes and fees for the cost recovery of water services and activities with a significant impact on the environment; and (iv) in certain cases, opportunity costs.

No data are available on precise costs to agriculture that can be attributed to the WFD. The case study below on the costs of implementation in a specific RBD provides further insight into the order of magnitude of the WFD implementation costs for agriculture.

One response in the public consultation, which came from a representative of the European agricultural sector, indicated opposition to any endeavour to valorise water and stressed that the existing approaches for water pricing are costly, time consuming and highly administrative.

Costs related to the Floods Directive

Estimating the costs related to the Floods Directive specifically is even harder than for the Water Framework Directive as the FD leaves discretion to the Member States to set their own objectives and then set and implement the appropriate measures accordingly. Member States setting higher levels of flood protection and prevention will incur higher implementation costs. Given the large climate variability, benefits and costs of adaptation also show a large variability across countries/regions[139]. In a survey of flood risk managers, no Member State indicated that the administrative costs induced by the Floods Directive are significant.

According to the costs of measures reported in the FRMPs, Member States should invest upwards of €12.5 billion between 2016 and 2021. According to recent studies[140], under a 'change nothing' scenario, flood damage exclusively from rivers in the EU is projected to rise due to the combined effect of climate and socioeconomic change from €6.9 billion/year[141] to €20.4 billion/year by the 2020s. Based on scientific modelling, it is estimated that the total costs of adaptation to a once-every-100-year flood event for Member States amount to 0.01-0.4% of GDP[142]. Cost-benefit ratios differ for every project, but are found to be higher than one and to pay back several times over[143].

[136] E.g. European Commission's Guide to Cost-Benefit Analysis of Investment Projects (DG REGIO, 2015) or OECD (2018) 'Cost Benefit Analysis and the Environment: Further Developments and Policy Use.
[137] E.g. https://natuurwaardeverkenner.be/, https://www.atlasnatuurlijkkapitaal.nl/
[138] Feuillette et al (2016).
[139] Rojas et al (2013).
[140] Rojas et al (2013).
[141] For the period 1981-2010.
[142] Rojas et al (2013).
[143] Kron et al (2019).

Case study example

The case study presented below is based on figures from a river basin district in western Europe. While every RBD is different, the case study provides some insight in the order of magnitude of the costs of measures[144].

Overall, the total public budget for water management, including water supply and sanitation and floods, amounts to €1.8 billion, which is a bit less than 1% of GDP. Around 45% of the public budget is spent on sanitation. The costs for 'management of water systems' represent less than 17% of the total water management budget.

The additional private costs[145] borne by households, business and agriculture are estimated to account for €600 million 0.3% of GDP. Part 2 of the case study below presents further details on the financing of measures and the rate of cost recovery.

Case study example — the costs of water management in an RBD in the EU (Part 1/2)

>> **Characteristics:**

- Population: 6 million
- GDP: €200 billion
- Number of water bodies in good status: 0%
    - Surface: ecological: <50%; chemical <5%
    - Groundwater: chemical: 20%; quantitative 80%
- Key pressures: hydromorphology, point source pollution, diffuse source pollution

>> **Costs of water management:**

:: Public costs:

	Million euro (2014)	**% of total**
Water supply	600	33%
Sanitation	800	45%
Management of water systems	300	17%
Flood protection	100	5%
Total	***1,800***	

:: Private costs: (in million euro, 2014)

	Households	**Business**	**Agriculture**
Water supply	105	125	20
Sanitation	30	200	110
Management of water systems	10	n.a.	n.a.
Total: 600	***145***	***325***	***130***

Benefits

The Directives improve the protection of EU waters e.g. by reducing concentrations of some metals in the water. They also improve the value of the aquatic ecosystems and wetlands, and of the services they deliver. The most important benefits identified by respondents in the public consultation (i.e. the proportion of responses indicating 'major benefit' or 'very significant benefit') were:

[144] Note: all numbers have been rounded up or down.
[145] These are the costs for self-services

- better knowledge of the water environment (67%);
- reduced emissions (47%);
- improved cooperation (53%);
- better public information (46%); and
- improved chemical and ecological status (44%[146]).

Difficulties in putting a value on benefits that can be attributed to the WFD

The valuation of the benefits that can be attributed to the WFD is challenging. First, this is because it is difficult to attribute benefits to specific measures or Directives. For example, the distinction between basic and supplementary measures is not always straightforward. More stringent treatment of waste water could be a 'basic measure' or a 'supplementary measure' depending on whether or not the discharges are in a sensitive area (where such advanced treatment is required by the UWWTD[147]). In addition, many measures are multifunctional and have multiple benefits that contribute to the objectives of several policies. For example, re-naturalisation of rivers contributes to flood prevention, climate adaptation and biodiversity conservation. A second challenge is that the valuation of benefits requires taking account of various non-quantifiable and location-specific factors, which limits the potential for aggregation and accurate monetisation[148]. This is the case for ecosystem services (see text box below).

Overview of ecosystem services delivered by wetlands and aquatic ecosystems

Ecosystem services are usually defined as the benefits that people, society and the economy derive from nature. Examples of these are water provision and purification, flood control, carbon storage and climate regulation. Some of these services are exchanged on markets (e.g. drinking water, fish), while others, such as flood protection, carbon sequestration or water purification, are not. The table[1] below provides an overview of the most important ecosystem services delivered by wetlands and aquatic ecosystems.

Type	Ecosystem service	Examples
Provisioning ecosystem services	Nutrition	Aquatic animals, plants and algae
	Water supply	Water for drinking purposes, water for non-drinking purposes (irrigation, hydro-power, industrial processes, …
	Raw materials	Fibres and other materials for direct use or processing, genetic resources medicinal resources, …
Regulating ecosystem services	Purification	Filtration and storage by micro-organisms, algae, plants and animals
	Regulation of water flows	Flood protection, natural water retention, …
	Climate regulation	Carbon sequestration
Cultural ecosystem services	Recreation	Tourism, fishing, water-sports, …
	Intellectual interactions	Science, education, heritage, …
	Spiritual interactions	Symbolic, existence, bequest

[146] Trinomics and Wood (2019). Of the responses indicating 'major benefit' or 'very significant benefit', the highest proportion of responses was observed for NGOs.
[147] COWI (2010).
[148] Several Member States have undertaken extensive studies or developed guidelines or databases for citizens and practitioners, see e.g. https://natuurwaardeverkenner.be/, https://www.atlasnatuurlijkkapitaal.nl

Studies on the valuation of ecosystem services are relatively scarce[1]. They are also difficult to compare because they use different assumptions and methodologies. One generally accepted figure was provided by the Millennium Ecosystem Assessment (2005[1]), which estimated the global economic importance of wetlands to be as high as €13.32 trillion, which at the time represented a bit less than 30% of the global GDP.

Studies on the benefits of implementing the WFD

In spite of these challenges, two studies have looked into the benefits of implementing the WFD. One study found that if 70% of all European water bodies were to reach good status, this would lead to benefits worth €11 billion per year[149]. Another study found that the implementation gap for water bodies failing to reach good ecological status would represent a foregone benefit of on average €8 billion per year[150]. However, these studies are based on a series of assumptions and extrapolations and should be interpreted with caution.

A review of the academic literature has identified five studies that carried out a detailed valuation of the benefits of the WFD in specific locations. This information is presented in table 3[151]. These studies are generally more robust but cannot be extrapolated[152]. The two studies on river restoration (Finland and Switzerland) show that the benefits of river restoration largely outweigh the costs. The study about the aquifer in Portugal shows that people's willingness to pay for safe drinking water quality and natural background levels largely exceed the amount on their water bill.

Overall these studies confirm that citizens' willingness to pay for water bodies in good status is considerable. The studies also indicate that benefits or willingness to pay tend to increase with ecological status. This can possibly be explained by the fact that ecosystems in good ecological condition tend to correlate with higher delivery of regulating and cultural ecosystem services[153].

Scope	Location	Findings	Method	Study
Total economic value (use and non-use values) of improved groundwater quality	Portugal (Aveiro quaternary aquifer)	Public willingness to pay (WTP) is 20-30% higher than residents' current water bill. Aggregated across the aquifer, the total economic value is €1.5 million for safe drinking water and €3.5 million annual for groundwater containing background levels only	WTP (1,200 interviews)	Brouwer et al. (2018)[154]
Non-market benefits of floodplain restoration	Danube (Austria, Hungary and Romania)	Household WTP amounts to 0.2-0.5% of annual household income for good water status (16-83 euro/household/year)	WTP (1,500 respondents)	Brouwer et al. (2016)[155]

[149] ACTeon (2012).
[150] COWI and Eunomia (2019).
[151] Valuation studies of rivers, lakes, wetlands and aquatic ecosystems are scarce. See e.g. Russi et al (2013) ; Reynaud et al (2019) or Bergstrom et al (2017).
[152] Brouwer et al (2016).
[153] Grizzetti et al (2019).
[154] Brouwer et al (2018).
[155] Brouwer et al (2016).

Scope	Location	Findings	Method	Study
Non-market benefits of water quality, natural river banks and biodiversity	Flanders (Belgium)	*Improvement of water quality* From bad to moderate quality: €158 per household per year From moderate to good quality: €102 From bad to good quality: €260 *Extrapolated to Flanders:* €240,000 per km of river €682 million for Flanders	WTP (800 respondents)	De Nocker et al. (2011)[156]
Value of recreational ecosystem services of a river rehabilitation project	Finland (river Pajakkajoki)	The value of enhanced provision of ecosystem services would offset the project costs in approximately 3-10 years (conservative estimate)	WTP 119 respondents	Polizzi et al. (2015)[157]
Cost-benefit analysis of two river restoration projects	Switzerland (Thur and the Töss rivers)	Ecological status evolved from poor to good Even if the restoration costs are substantive (€2-5 million per km), they are largely outweighed by the benefits, even in the most conservative scenario Net present value CHF 706-885 million	Costs based on total project costs Benefits based on total economic value	Logar et al. (2019)[158]
Non-market benefits of potential water quality changes for households	England and Wales (UK)	£2,263-39,168 per km² (values are higher for improvements from medium quality (poor/moderate ecological status) to high quality (good/high ecological status) than they are from low quality (bad ecological status) to medium quality (poor/moderate ecological status)	Stated preference (1,060 respondents)	Metcalfe et al. (2012)[159]

Table 3: Overview of benefit valuation studies relevant to the WFD

Avoided costs

Another angle for looking at the benefits of water in good quantity and quality is to estimate the avoided costs. For example, the fitness check of the EU's most relevant chemicals legislation estimates that the reduced contamination[160] by pesticides of surface and groundwater reserves leads to €500 million of avoided costs per year[161]. Similarly, another study found that in the hypothetical scenario of reduced access to water, i.e. if enterprises were no longer able to access water at present levels of quantity and quality, their direct use costs of water would increase by 15 to 55%[162].

The first findings about the economic impact of the 2018 drought also point out the value of water in the economy. A study for the Netherlands found that the economic impact of the 2018 drought amounted to €450 to 2,080 million[163]. In Belgium, statistics on agricultural productivity show a decrease of net value added of 25% compared to 2013-2017[164]. Preliminary numbers about the economic impact of the low water levels of the Rhine show

[156] De Nocker et al (2011).
[157] Polizzi et al (2015).
[158] Logar et al (2019).
[159] Metcalfe et al (2012).
[160] This reduced contamination is attributed to the Plant Protection Products Regulation, the WFD, the EQSD and the Drinking Water Directive.
[161] European Commission (2019) — SWD(2019) 199.
[162] Ecorys (2019).
[163] Ecorys (2019) Study for the Dutch Ministry for Infrastructure and Water.
[164] https://statbel.fgov.be/nl/nieuws/definitieve-raming-van-de-oogst and https://www.boerenbond.be/actualiteit/belgisch-statistiekbureau-bevestigt-moeilijk-landbouwjaar-2018

that freight transport by inland waterways decreased by 11.1%[165], having a significant impact on supply to major companies, some of which had to temporarily stop or decrease their production.

Financing of measures

Providing adequate financing to reach good status

The Commission's latest implementation report showed that the objectives for the programmes of measures are mostly determined by what can be delivered with the budgets and policies that are already in place (see also Section 5.1.3). Insufficient use is being made of the principle of cost recovery, while exemptions based on disproportionate costs are not always adequately justified.

Cost recovery, water pricing and the polluter pays principle

Article 9 of the WFD requires Member States to: (i) take into account the polluter pays principle and the principle of cost recovery of water services, including the financial, environmental and resource costs; and (ii) ensure an adequate contribution of the different water uses to the recovery of costs.

Until now, the implementation of Article 9 has led to mixed results. On the one hand, the Commission's latest implementation report found that Article 9 implementation had led to better water-pricing policies, including the use of volumetric charging and incentive pricing. Several Member States have also introduced taxes or made changes to their legal framework to ensure a certain rate of cost recovery for activities that have a significant impact on water bodies or to finance WFD-specific measures. Member States have also made considerable efforts to document the financial costs of measures.

On the other hand, the Commission's latest implementation report also indicates that there is still significant room for improvement on exactly the same points. Although a large majority of respondents regard water pricing as an instrument that strongly contributes to sustainable water use, the 'adequate contribution' of certain water uses remains low to non-existent in several Member States. Incomplete cost recovery represents a hidden cost to society, especially when the environmental and resource costs are not taken into account. It also puts a strain on a potential source of revenue to finance measures, even though cost recovery may not be technically feasible in all cases, e.g. because legacy pollution makes it difficult to identify the polluter or because the transaction costs are high.

The insufficient contribution from certain water users is an issue emphasised by the responses submitted by campaign respondents to the public consultation. Representatives of the water sector also point to the increasing costs of treatment, which are passed on to the consumer rather than being paid for by the polluter. In contrast, representatives of the agricultural sector oppose water pricing and the monetisation of ecosystem services.

Figure 17 shows that the rate of cost recovery for water supply and sanitation varies widely between Member States. While some Member States manage to finance their water supply and waste water sector almost entirely through revenues from water tariffs, others rely heavily on the public budget. Differences between countries can mostly be explained by (the lack of) political decisions that are taken. According to the OECD, in some countries affordability can be a concern for the lowest income households. In these cases, this should

[165] https://www.destatis.de/DE/Presse/Pressemitteilungen/2019/03/PD19_112_463.html.

be addressed through targeted social measures, so that tariffs can be designed to manage demand for water services and to raise funds[166].

No exhaustive data are available on the extent of cost recovery for measures targeting other key pressures such as diffuse pollution, abstraction for non-domestic purposes and hydromorphology, yet the last Commission assessment report of the RBMPs points to a large variability between the Member States, which can mostly be attributed to political choices. Concerning water supply for industry and agriculture competitiveness is sometimes used as an argument. Data show, however, that water as an input to water-dependent sectors only represents around 5% of gross value added in these sectors[167]. Nonetheless some good practices exist. In France, for example, revenues from taxes targeting pollution or abstraction are used to finance water measures, while in Portugal there is a water resources tax that is earmarked for integrated water management. This indicates that an exchange of best practices between Member States could be beneficial, especially with a view to improving sustainable finance methods to achieve the Directive's objectives. The 2019-2021[168] CIS work programme provides for the possibility of a new ad hoc task group on economics, which could contribute to this goal. A joint study project with the OECD on this topic will also be launched shortly.

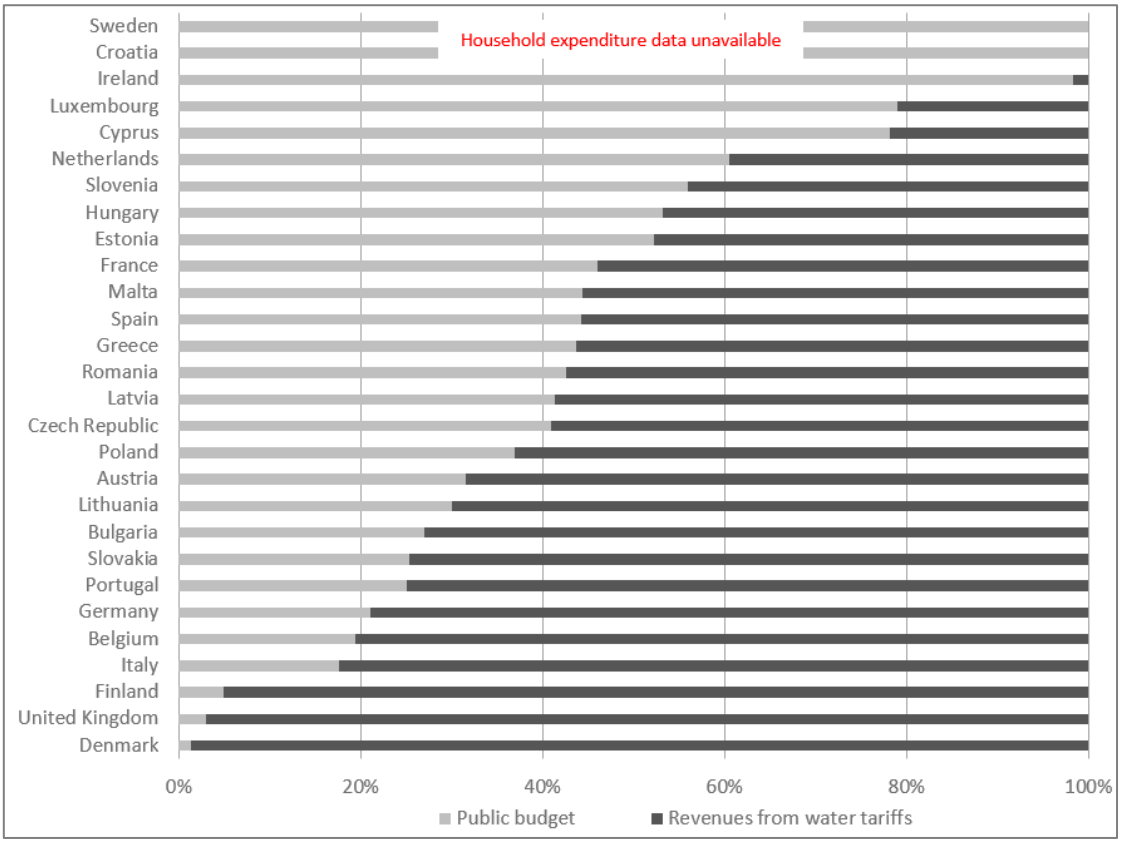


Figure 17: Sources of finance for water supply and sanitation services per Member State as annual average over the period of 2011-2015[169]*. Source: OECD (forthcoming)*

[166] OECD (forthcoming)
[167] Ecorys (2019)
[168] https://circabc.europa.eu/ui/group/9ab5926d-bed4-4322-9aa7-9964bbe8312d/library/dd9b4484-2935-4ee8-b3ce-72f844f3644c?p=1&n=10&sort=modified_DESC
[169] The OECD notes that there is likely an overestimate of supply-related expenditures (and corresponding underestimate of sanitation) in countries where waste water-related charges are included in the water bill.

Disproportionate costs

For water use activities and water uses for which the costs cannot be recovered, public investments are justified because: (i) the many benefits of water in good quantity and quality accrue to society as a whole, including citizens, business and agriculture; and (ii) in many cases the benefits outweigh the costs. However, when the measures to be taken would be disproportionately expensive within the WFD timescale, Member States can obtain an exemption under certain conditions.

While the notion of 'disproportionate costs' is not specified in the Directive, the CIS has issued two guidance documents that provide some further detail. Guidance Document No 1 on economics discusses some requirements for cost-benefit analysis, and states that the margin by which costs exceed benefits should be appreciable and that the assessment of costs and benefits needs to include both quantitative and qualitative aspects. Guidance Document No 20 on exemptions discusses affordability issues and points out that alternative financing mechanisms should always be considered, including cost recovery and seeking recourse to the public budget, EU funds and private investments.

In practice, the methodologies for benefit valuation can lead to variable results depending on the parameters used. For example, a recent article in a scientific journal on the use of cost-benefit analysis demonstrated how in one Member State the choice of the methodology and the parameters had significant impacts on the determination of disproportionate costs[170]. The authors cite the example of two river basins for which the costs and qualitative ecological benefits of restoring good water status were similar. In the example, the number of inhabitants in one river basin made its estimated monetary value significantly lower than for the other. As a result, it was decided that the costs for the former were disproportionate. This points to the importance of taking due account of the limitations of monetary valuation and also of the need to take qualitative benefits into account.

Case study example

Even if every RBD faces different challenges, the example below provides some interesting insight in the financing of measures. It shows that in this RBD, full cost recovery is achieved for water supply and 80% for sanitation. The rate of cost recovery for the management of water systems is close to zero[171] as these public costs are paid for by general tax revenues.

Looking at the distribution of the costs[172] it can be seen that 80% of the costs are covered by direct contributions (i.e. taxes, fees and private contributions) and 20% is provided from the general public budget. Households contribute the most to the costs (55%), mostly through direct fees for water supply and sanitation. Industry contributes mostly through direct fees and private costs; the contribution of agriculture is generally low.

For the second RBMP, an analysis was carried out for this RBD to assess the costs and feasibility of different scenarios. Based on this analysis, it was decided to aim at 10-30% of bodies in good status by 2021, which would come at an additional cost of €70 million (4% of the current budget). For all other water bodies, an extension of the deadline is reported, based on disproportionate costs and natural conditions.

[170] Feuillette et al (2016).

[171] These cost recovery rates only include financial costs. Environmental and resource costs are not included in the calculation.

[172] Public and private

The 'maximum' scenario[173] in which 65% of water bodies could reach good status would come at an additional cost of €300 million (17% of the current budget), of which 55% is needed for sanitation infrastructure. This scenario is stated to be disproportionately costly, even if a theoretical analysis based on affordability criteria indicates that €1 billion could be raised from households[174], €480 million from industry and €20 million from agriculture.

In sum, the case study example shows how in practice the adequate contribution of water uses is not always secured, how the principle of cost recovery is not used to its full potential and how exemptions based on disproportionate costs are used beyond what they were initially introduced for. In this RBD, a political decision has been taken to choose a scenario with a lower level of ambition, only reaching good status for 10-30% of all water bodies. Reaching good status for 65% of all water bodies would be possible with a 17% (€300 million) increase in the water budget, most of which would be needed for investments in sanitation. While an analysis based on affordability criteria shows that €1.5 billion could be raised through cost recovery, it was decided not to do so and to aim only for a scenario involving an additional cost of €70 million, which would come from the public budget, but which in practice has been committed only to a very limited extent.

Case study example — the costs of water management in an RBD in the EU (Part 2/2)

>> Costs of water management, cost recovery and distribution of costs

:: Public costs:

	Million euro (2014)	**Direct contributions (cost recovery)**	**Indirect (public budget)**
Water supply	600	>100%[175]	0%
Sanitation	800	80%	20%
Management of water systems	300	5%	95%
Flood protection	100	unknown	unknown
Total	*1,800*	*1,455 million*[176]	*245 million*

:: Contribution to costs disaggregated by water user:

	Direct contribution	**Indirect contribution**	***Total***
Households	40%	15%	*55%*
Industry	30%	5%	*35%*
Agriculture	6%	0.1%	*6%*
Other	4%	0%	*4%*
Total	*80%*	*20%*	*100%*

[173] On the basis of the available assessments

[174] It is noted that for the low income households this would require some social measures.

[175] A cost recovery rate beyond 100% implies cross-subsidisation.

[176] No data available on the cost recovery of flood protection measures; the sum of the contributions (1,455+245) therefore equals 1,700 (1,800-100).

5.2.2: 'What factors have influenced the efficiency of implementation? Have good practices be identified?'

Overall response:

Cooperation between the Member States and the Commission under the common implementation strategy has significantly enhanced the understanding of what needs to be done to reach the Directives' objectives and how this can be done at the lowest possible cost.

In addition, four issues could have a positive impact on the efficiency of implementation.

- First, the proper implementation of integrated water management taking into account the interlinkages and feedback loops between pressures makes it possible to compile an effective and efficient programme of measures.
- Second, cost-effectiveness analysis is a useful tool to support the WFD and the FD's approach based on subsidiarity, which allows for costs to be minimised by adapting measures to local circumstances.
- Third, the reduction of pollution at source can save costs due to the reduced need for mitigation measures.
- Finally, green infrastructure or nature-based solutions offer multiple benefits in many cases, thus offering potential for all the affected legislation and policies to be implemented more efficiently. For example, wetland and floodplain restoration offers solutions for reducing flood risk that can be very cost-efficient thanks to their relatively low per unit investment and maintenance costs. In addition, they provide a number of indirect benefits such as biodiversity preservation, climate change adaptation and groundwater recharge.

Sufficient maturity has been reached in the understanding of what needs to be done to achieve the Directives' objectives and how this can be done at the lowest possible cost. These are the fruits of the exchange of good practices under the common implementation strategy (CIS), the lessons learned from the Commission's implementation reports and the studies carried out by the Member States. Of course, there is still significant room to translate this knowledge into practical measures. Even if the challenges are manifold and never identical for every Member State, four issues that affect the efficiency of the implementation have been identified:

- implementation of integrated water management;
- the use of cost-effectiveness analysis for the selection of measures;
- reduction of pollution at source; and
- the use of green infrastructure.

Integrated water management

Integrated water management — including a thorough pressures and impacts analysis and identification of the appropriate measures to address (multiple) pressures — improves not only the Directives' effectiveness (as discussed in Section 5.1.3), but also their efficiency. Only when interlinkages and feedback loops between pressures are taken into account is it possible to compile a programme of measures that improves the status of water bodies at the lowest possible cost, e.g. by prioritising measures that bring multiple benefits. Research has also shown that integrated water management can prevent maladaptation against flood risks (i.e. under- or over-designing protection measures).

Cost-effectiveness analysis

Cost-effectiveness analysis is a decision support tool assessing the cost and effectiveness of alternative policy options in realising a pre-set objective[177]. It was given a pivotal role in the WFD because it enables Member States to identify a combination of mitigation measures to achieve a given environmental objective at the lowest economic cost. In contrast with cost-benefits analysis, which requires a lot of data and a comprehensive monetisation of benefits (which is not generally accepted), cost-effectiveness analysis compares investment costs with management effects, which can be expressed in any unit[178].

Cost-effectiveness analysis is a useful tool to support the WFD and the FD's subsidiarity-based approach, which allows for costs to be optimised by adapting measures to local circumstances. Studies have found that identifying localised, targeted and context-specific measures can help achieve the Directive's objectives in a more cost-effective manner than standardised prescriptions of measures[179]. For example, one study found that if the 2009 programme of measures for Flanders, which was designed uniformly for the entire region, were to have been optimised at the scale of individual water bodies, the annual costs could have been reduced by 22%, while still achieving similar emission reductions in every water body. If emission reduction targets had not been restricted to the water body itself but instead had also been realised in upstream areas, the annual costs could have been reduced by 33% compared to the uniform approach[180].

Since the adoption of the WFD, several Member States have invested in sophisticated models for the economic optimisation of measures[181]. In Finland, researchers have developed a tool[182] that evaluates cost-effectiveness of phosphorus load-reduction measures at catchment level. The tool's use in the second RBMP led to the identification of measures that would achieve a load reduction rate of 35% at the same costs (compared to 16% in the first RBMP[183]). The increasing accessibility of analytical models should now allow for widespread and systematic use of quantitative cost-effectiveness assessments in all river basins in order to identify optimal management measures[184].

Reduction of pollution at source

One policy option that has the potential to make implementation of the WFD more efficient is the reduction of pollution at source, which saves costs due to the reduced need for costly end-of-pipe measures or additional treatment of water abstracted for drinking water[185]. One concrete example is the reduction of phosphorus in detergents, which has contributed to the decrease of phosphorus in EU waters[186] and has further potential in this respect.

[177] Martin-Ortega and Balana (2012).
[178] Boerema et al (2018).
[179] Balana et al (2015).
[180] Broeckx et al (2014).
[181] For an overview of case studies in the UK, the Baltic Sea countries, and Italy, France and Spain, see Balana et al (2011).
[182] The KUTOVA model. The tool includes 19 different measures from agriculture, forestry, scattered settlements and peat mining. It focuses on phosphorus, which is a more common growth-limiting nutrient than nitrogen in fresh waters.
[183] Trinomics and Wood (2019).
[184] Pistocchi et al (2017).
[185] Articles 10, 16 and 17 WFD include provisions that promote source control.
[186] Bouraoui et al (2014).

The evaluation of the Urban Waste Water Treatment Directive shows that waste water collection and treatment is an effective strategy to ensure the protection of water bodies and human health. This is in spite of the fact that waste water treatment as required under the UWWTD focuses on the pollutants deemed to be the most relevant ones in the 1990s (i.e. biological oxygen demand, nitrogen and phosphorus). However, collection systems and waste water treatment plants have high capital and operation and maintenance costs, which increase with the amount of pollutants that need to be removed. In addition, waste water treatment removes some persistent pollutants as a side effect, but not all of them. The remaining residues can persist in the environment for centuries.

Several Member States have therefore introduced programmes and strategies to reduce the amount of chemical and micro-pollutants entering the aquatic environment. France has set up a comprehensive monitoring programme to reduce micro-pollutant emissions[187]. Germany has developed a trace substance strategy based on multi-stakeholder dialogue, with the goal of preventing and reducing inputs of trace substances from biocides, human and veterinary pharmaceuticals, plant protection products, industrial chemicals, detergents and personal care products into the aquatic environment[188].

One area where there is room for improvement is diffuse nutrient and chemical pollution from agriculture. For example, balanced fertiliser application at farm level would allow for improvement in agricultural production while reducing costs to farmers and minimising discharges to the environment. Nevertheless, several good practices exist. Belgium, Ireland and the Netherlands, for example, have opted to set limits for total applicable nitrogen for all crops, as a simple and clear way to inform farmers about their obligation and to facilitate controls.

Similarly, for pesticide applications, the 'Ecophyto' plan in France set a pesticide reduction target of 50% by 2025, while Sweden has set a goal of almost zero pesticides in surface water and groundwater by 2020[189].

Green infrastructure

Green infrastructure or nature-based solutions in many cases offer multiple benefits, offering potential to make implementation of all affected legislation and policies more efficient. The Commission recently published a guidance document on green infrastructure aimed at scaling up investments[190]. The global scientific community is also putting increased emphasis on nature-based solutions, securing water resources and restoring ecosystems and their services in addressing climate change, adaptation and biodiversity collapse.

A report by the European Environment Agency on green infrastructure and flood management reviewed the costs and benefits of grey and green infrastructure projects and found that wetland restoration and floodplain restoration are particularly attractive options because they offer a high degree of flood risk protection and provide many additional ecosystem services[191]. Figure 18 presents the key findings of the report. It shows that wetland

[187] France, Ministère de la transition écologique et solidaire 'Plan micropolluants 2016-2021 pour préserver la qualité des eaux et la biodiversité'.
[188] See https://www.umweltbundesamt.de/themen/wasser/wasser-bewirtschaften/mikroverunreinigungen-in-gewaessern#UBA-Empfehlungen
[189] European Commission — SWD(2017) 153.
[190] European Commission — SWD(2019) 193.
[191] EEA report 14/2017.

and floodplain restoration can be very cost-efficient flood risk-reduction solutions thanks to their low per unit investment and maintenance costs. In addition, they provide a number of indirect benefits such as biodiversity preservation, climate change adaptation and groundwater recharge.

Costs data represent an average of the standardised unit costs for different GI projects realised across the EU.

Direct effects represent biophysical characteristics of infrastructure measures that provide protection to flooding.

Indirect effects represent ancillary benefits that the infrastrcuture measure provides in terms of additional eco-system services. Effect scores range from 0 (no effect), 1 = low effect, 2 = medium effect and 3 = high effect, which are sourced from the NWRM project.

	Costs			Direct effects			Indirect effects (eco-system benefits)									
	Land acquisition & Compensation	Construction & rehabilitation	Operation and maintenance	Storing and slowing run-off	Storing and slowing river water	Reducing run-off	Water storage	Fish stocks and recruiting	Natural biomass production	Biodiversity preservation	Climate change adaptation	Groundwater recharge	Erosion control	Filtration of pollutants	Recreational opportunities	Aesthetic/cultural value
	EUR/ha (m)		EUR/ ha/y	0/1/2/3			0/1/2/3									
Wetland restoration and management	13 302		348	3,0	2,0	1,7	2	3	2	3	2	2	1	2	2	2
Re-meandering	92 592		2	2,0	2,5	1,7	2	2	3	3	2	3	3	2	3	3
Stream bed re-naturalisation	20 114		*n.a.*	0,0	2,5	1,7	1	1	2	3	0	1	3	2	2	2
Floodplain restoration	153 279		2 412	3,0	3,0	2,3	3	3	3	3	2	3	3	2	3	3
Dike building or reinforcement	**2 283a**		**1 %**	*n.a.*	*3,0*	*n.a.*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*2*	*1*
Longitudinal barriers	**1 440 000a**		**5–10 %**	*n.a.*	*3,0*	*n.a.*	*3*	*0*	*0*	*0*	*0*	*0*	*2*	*0*	*1*	*0*

Note: n.a., not applicable.

(*) Costs in euros per metre of dike or longitudinal barrier (assuming a 1 m elevation).

Figure 18: Overview matrix of green versus grey infrastructure measures for flood protection (Source: European Environment Agency, 2017[192])

Studies on constructed wetlands show similar results. One scientific study compared the cost and performance of a series of constructed wetlands with those of traditional grey infrastructure. It found that: (i) the green infrastructure performs equally well or even better than the grey infrastructure alternative for water purification and flood protection; (ii) it has a similar cost; and (iii) provides additional benefits like wildlife support and recreation[193]. Another study found that green infrastructure solutions may also be cost-effective and cost-competitive for business, while simultaneously providing public and ecosystem benefits[194].

[192] EEA (2017).
[193] Liquete et al (2016).
[194] Reddy et al (2015).

The advantages of green infrastructure: the ability of wetlands to filter pharmaceuticals

Wetlands (such as floodplains) are the most biologically diverse of all ecosystems, serving as home to a wide range of plant and animal life. They have been described both as 'the kidneys of the landscape', because of the functions they perform in the hydrological and chemical cycles, and as 'biological supermarkets' because of the extensive food webs and rich biodiversity they support[195]. Wetlands provide resources such as food, water and raw materials, contribute to mental health and have scientific, aesthetic and spiritual benefits.

Constructed wetlands can be very effective and cost-efficient at removing pollutants from waste water. These units, which mimic natural wetlands and which require low external energy and are easy to operate and maintain, are used worldwide to treat domestic and industrial waste waters from raw sewage to tertiary-treated waste waters. Constructed wetlands can also be a viable and cost-efficient solution for the removal of emerging pollutants. A recent scientific pilot project has demonstrated the potential of constructed wetlands to remove pharmaceuticals from waste water, with removal rates for different pharmaceuticals ranging up to 90% (see Figure 19 below).

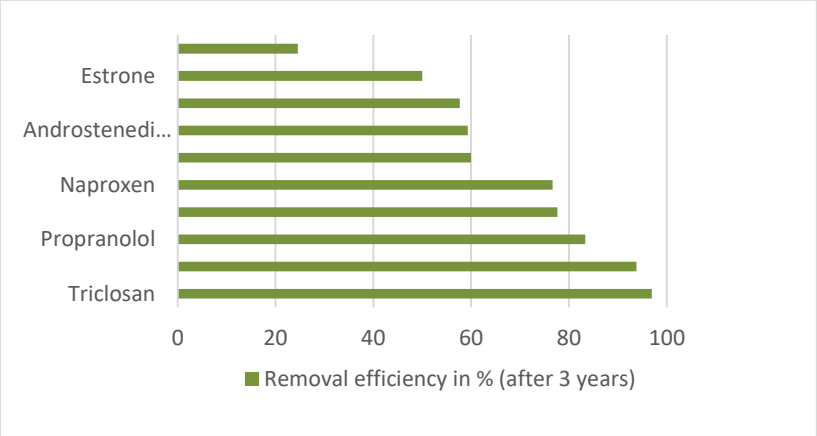


Figure 19: Removal efficiency rates after 3 years of a constructed wetland (Source: Vystavna et al.)

5.2.3: 'To what extent are monitoring and reporting requirements fit for purpose?'

Overall response:

The Directives entail comprehensive monitoring and reporting requirements, which are mostly functional instruments to increase the effectiveness and efficiency of the measures.

Monitoring aims to provide a clear and comprehensive overview of the status and pressures within each river basin district. Overall, responses to the public consultation find monitoring to be one of the elements that has most contributed to achieving the WFD's objectives. In the targeted consultation, some experts (from NGOs and one competent authority) indicated that they regard the difference between surveillance and operational monitoring as an artificial division that is difficult to implement in practice, leading to unnecessary complications.

There are still significant gaps in the monitoring of the ecological and chemical status of surface water bodies and the chemical and quantitative status of groundwater bodies. This is an opportunity forgone, as fulfilment of the monitoring obligations under the WFD is fundamental to support robust and cost-efficient decision-making and given that the cost of monitoring is minor

[195] Barbier et al (1997).

compared to the cost of mitigation and restoration measures.

The Directives' requirements for RBMPs, FRMPs and public consultation are necessary to keep the policy discretion provided by the WFD and the FD in check and to provide transparency to the public about the state of European waters and the choices that are made to improve this.

The introduction of the WFD led to the repeal of several directives and one decision, all of which had required reporting from the Member States. After significant start-up and learning costs, and extensive consultation and agreement with the Member States, the reporting model is now reasonably stable. Moreover, in many cases, data which are not expected to change significantly over time will not have to be reported again; this will significantly reduce the reporting effort. The approximate annual administrative burden for the WFD was estimated to be 'fairly large' and on the same scale as many other directives in the fitness check of reporting and monitoring of EU environmental policy. For the FD and the EQSD, the approximate annual administrative burden to Member States was estimated to be 'moderate'. It also found that the benefits of reporting obligations significantly exceed the costs.

The Water Information System for Europe (WISE), developed by the Commission and the European Environment Agency, has harmonised electronic reporting to build comparable publicly accessible EU datasets and stimulated the development of national information systems.

Monitoring

The WFD has introduced a targeted approach to monitoring

As discussed in Sections 5.1.2 and 5.1.3, the monitoring requirements introduced by the WFD aim to provide a clear and comprehensive overview of the status and pressures within each river basin district, therefore allowing for informed decisions concerning the programmes of measures. The requirements concern both surface and groundwater bodies and are applicable to the respective processes under the EQSD and GWD. To optimise the use of resources, the WFD introduced a monitoring approach that distinguishes between three types of monitoring, each with a different function. Surveillance monitoring is required to investigate the overall water body status within a catchment or sub-catchment. The results from surveillance monitoring should then be used to inform the locations for operational monitoring, which is required to assess the status of water bodies identified as being at risk of failing to meet the Directive's objectives. Finally, where a water body is identified as failing to achieve good status and the reason is unknown, investigative monitoring is required to diagnose the cause of degradation[196].

Overall, the public consultation found monitoring to be one of the elements that has most contributed to achieving the WFD's objectives, with 85% of respondents (n=462) responding that they 'agree' or 'substantially agree'. Of the responses indicating 'agree' or 'substantially agree' (n=395), the highest proportion of total responses was observed for EU citizens (37%) and industry (29%). Almost 75% of respondents to the public consultation agree that the monitoring obligations of the WFD target the right issues.

In the targeted consultation, some experts (from NGOs and one competent authority) indicated that they regard the difference between surveillance and operational monitoring as an artificial division that is difficult to implement in practice, leading to unnecessary

[196] Collins et al (2012).

complications. Indeed, in many cases, Member States use the same monitoring sites for surveillance and operational monitoring[197].

Significant gaps remain in the monitoring networks

Even though the deadline for setting up the monitoring networks was 2006, significant gaps remain in the monitoring of the ecological and chemical status of surface water bodies. The same is true for chemical and quantitative status of groundwater bodies. For chemical status in particular, there are five Member States for which more than 60% of their water bodies have unknown status. In essence, this is an opportunity forgone, as fulfilment of the monitoring obligations under the WFD is fundamental to support robust and cost-efficient decision-making and given that the cost of monitoring is minor compared to the cost of mitigation and restoration measures[198].

In Member States where the level of monitoring is insufficient, this shortcoming can be attributed to organisational problems in the managing authorities, as well as a lack of resources allocated to monitoring. A large number of substances need to be monitored, and this requires specialised knowledge and equipment, which is not always available in all Member States. Member States therefore needed either to develop the capacity in their own labs to perform those analyses or to contract labs in other countries to perform them, which requires time and sufficient financial resources.

Reporting

Reporting requirements

Article 13 of the Water Framework Directive requires Member States to publish and update their RBMPs every 6 years. The elements that should be included in the RBMPs are described in Annex VII. In addition, Article 15 of the WFD requires Member States to send a copy of their RBMPs to the Commission and send an interim report on the implementation of the programmes of measures 3 years after each RBMP. Further reports are required under the EQSD and the GWD (on monitoring data).

Similar requirements exist under the Floods Directive for FRMPs every 6 years, timed to coincide with the reporting on RBMPs as of 2015.

The Commission needs to publish a report on the implementation of the Directives every 6 years. For the WFD, a review of the status of water bodies should be undertaken in coordination with the European Environment Agency (Art 18(b)).

The Directives' extensive requirements for the RBMPs and, less so, for the FRMPs are necessary because of the high degree of flexibility in the framework approach: to be cost-effective, water management needs to be adapted to local circumstances while keeping an overview on compliance. In other words, reporting is indispensable, irrespective of whether the objectives are being reached and the right methodologies are being used. As discussed in the section on effectiveness, the requirements on the information that needs to be included in the RBMPs and FRMPs have led to increased public participation and transparency (see Section 5.1.2), which is acknowledged by all stakeholders.

[197] Trinomics and Wood (2019).
[198] Carvalho et al (2019).

Electronic reporting

In order for the Commission to be able to produce the required implementation reports and to make information on the implementation of the Directives available to the public, Member States have agreed to report electronically on the contents of the RBMPs in an agreed format using the European Environment Agency's Reportnet system. The data collected in this way is one of the main bases for the Water Information System for Europe (WISE[199]). The WISE database contains data from the first and second cycles of river basin management plans reported by EU Member States and also, for the second RBMPs, by Norway. Products generated from the WISE database and available through the EEA web site currently include structured information (maps, graphs and tables) about surface water bodies (number and size, water body category, ecological status or potential, chemical status, significant pressures and impacts) and about groundwater bodies (number and size, quantitative status, chemical status, significant pressures and impacts). Additional products are being developed on exemptions and measures. Following the example of the RBMPs, the WISE system was then also used for the reporting of the first FRMPs.

The fitness check on reporting and monitoring of environmental policy concluded that WISE has contributed to the modernisation of reporting. Since its launch in 2007, it has harmonised electronic reporting to build comparable publicly accessible EU datasets (also beyond the WFD) streamlined with 'State of the Environment' reporting to avoid duplication and ensure complementarity (the 'provide once, use often' principle). It has also stimulated the development of national information systems in countries like Sweden, France, Spain, Austria and Ireland[200]. Thanks to WISE's dashboard format, such data can be filtered and sorted, making it possible for citizens, researchers and policy-makers to gain easy access to the latest available data. Based on the data in WISE, the Commission and the EEA have also developed a map viewer[201], which enables the general public to find detailed information about every water body in the EU.

Costs of reporting

The introduction of the WFD led to the repeal of several directives and one decision[202], all of which had required reporting from the Member States. This led to a decrease in reporting requirements by 20% in 2008 and by 40% in 2013, even though the scope of water policy had been broadened[203]. Nonetheless, the introduction of the WFD triggered significant start-up and learning costs. The reporting guidance for the second RBMPs, which was developed after extensive consultation and agreement with the Member States, has addressed most of these initial problems and the reporting model is now reasonably stable, with only minor changes needed for the reporting of the third cycle of RBMPs. In many cases, data which are not expected to change significantly over time (e.g. the spatial location of different elements) will not have to be reported again, which will significantly reduce the effort needed for the reporting.

The fitness check of reporting and monitoring of EU environmental policy[204] estimated the approximate annual administrative burden for the WFD to be 'fairly large' (i.e. between

[199] https://water.europa.eu/.
[200] European Commission — SWD(2017) 230.
[201] https://maps.eea.europa.eu/wab/WaterFrameworkDirective/
[202] See WFD Art 21.
[203] European Commission –SWD (2012) 393.
[204] European Commission (2017) — SWD (2017) 230.

€100 000 and 1 million) and on the same scale as many other pieces of EU legislation, such as the Nitrates Directive, REACH and the Waste Framework Directive. For the FD and the EQSD, the approximate annual administrative burden to Member States was estimated to be 'moderate' (i.e. between €30,000 and €100,000). However, the fitness check of reporting and monitoring of EU environmental policy[205] also found that the benefits of reporting obligations significantly exceed the costs, as without reporting on obligations there can be no confidence in implementation or whether legislation is working or not.

Electronic reporting: good practice example

Together with efforts at EU level to optimise electronic reporting, some Member States are developing their own national reporting systems in order to reduce the cost of reporting. One example is the system currently being developed by Spain, which mirrors the WISE database in a system that enables water managers to update information in the database when it changes, without being linked to the reporting cycle. The required reporting to the Commission can then be done by taking a 'snapshot' of the situation at the required points in time, without the burdensome data collection involved in the reporting of the first and second cycles of RBMPs. This shows that the administrative burden on regional and local authorities partly depends on the governance set-up at national level.

5.2.4: 'To what extent are there opportunities to simplify the legislation or reduce unnecessary regulatory cost without undermining the objectives of the Directives?'

Overall response:

The results of the consultation and experience to date suggest that there is some limited room to simplify and reduce the Directives' administrative burden without jeopardising their objectives.

As to the performance of the EQSD, the list of priority substances is today considered as partially not up-to-date. For both the EQSD and the GWD, the potential should be explored for streamlined methods to prepare updates in line with scientific developments in a more efficient manner.

On monitoring, the uptake of innovative monitoring technologies, including satellite data and automated sensing technologies, has great potential to better standardise collection of specific types of data across Europe and enhance confidence in WFD classification. Furthermore, the growing use of citizen science and smartphone applications can provide not only greater coverage and potentially reduced costs, but can also deliver greater public understanding and engagement in water management.

For the WFD, simplification of the reporting process is ongoing, mainly to avoid repeating information which does not change over time and to avoid repetition of data in different parts of the report. For the FD, simplifications to reporting for the upcoming second cycle of implementation have already been developed by the Commission in close cooperation with Member States.

The harmonisation of spatial reporting under different directives is also ongoing, as is the preparation, by the EEA, of a new generation system, Reportnet 3.0, which is expected to enable a much higher degree of coordination. Together with the full implementation of the INSPIRE Directive, this should eventually lead to the replacement of most of the formal reporting to the Commission/EEA with the availability at national level of all the information through INSPIRE-compliant 'services'. In some Member States, the application of digital solutions has helped to reduce the administrative burden further, but additional potential remains.

[205] European Commission — SWD (2017) 230.

While the requirement to consult the public as such was not challenged in the public consultation, a position paper from a group of Member States' Water Directors (the 'Consultation group') argues that the public consultation requirements should allow for more flexible consultation periods. Respondents who participated in the NGO campaign acknowledge that public consultation has led to a substantial improvement in transparency and public participation, but indicate that the consultations insufficiently involve environmental groups and the general public.

Less than a third (27%) of the respondents to the public consultation (mostly EU citizens, industry and industry associations, n=537) agreed or strongly agreed that simplification[206] of the Directives is possible (e.g. reducing monitoring and reporting requirements), whereas 30% of respondents disagreed or strongly disagreed (the respondents include mostly EU citizens and NGOs).

Chemicals

The list of priority substances and EQS

As to the performance of the EQSD, the list of priority substances is today considered as partially not up-to-date. On the one hand, some substances proven to be toxic to people and the environment are not on the list, whereas it still contains other substances no longer found in a significant number of water bodies[207] and which therefore may be considered for de-listing. The process of listing substances in the Annex to the WFD[208] has proven cumbersome and rather time consuming, making it a challenge to keep the list fully relevant. Further reflection on the approach taken could thus be useful.

The revision of the WFD Annex requires an ordinary legislative procedure and adoption by the European Parliament and Council; the same holds for revisions to Annex II to the GWD. The watch list[209] is revised through an implementing act adopted by the Commission after consultation of a committee of Member State representatives. In all cases, however, the revisions have to be made on solid scientific grounds to ensure that the most relevant substances are included. Collecting the necessary data to support the addition or removal of a substance from one list or the other is a time-consuming process. Furthermore, the substances included in the watch list or in the Annex to the WFD will have to be monitored by Member States, so new substances can be added only when adequately sensitive analytical methods for their monitoring exist and are not disproportionally costly. The development of such analytical methods can itself be a lengthy and expensive process.

The lack of an automatic link between the watch list and the priority substances list appears to be a source of uncertainty. In fact, when sufficient data are available on a substance from the watch list process, that substance is removed from the watch list and the data collected will be used to inform the next revision of Annex X to the WFD. This can take several years.

[206] 'Simplification' is understood as achieving the same results but with fewer resources.
[207] EEA Report 18/2018.
[208] The EQSD includes a provision for a watch list mechanism designed to allow targeted EU-wide monitoring of substances of possible concern to support the prioritisation process in future reviews of the priority substances list.
[209] Since 2013, the Directive has also required Member States to monitor substances on a **watch list** to gather information to support the review of the priority substances list (see Section 2.1).

Monitoring

Innovative technologies to improve data and reduce costs

Looking towards the future, experts have indicated in interviews that the uptake of novel technologies could be better and that some technical annexes and guidance documents take too prescriptive an approach. However, there seem to be no legal barriers in the WFD that would prevent the uptake of innovative monitoring technologies, should these provide equivalent results in terms of accuracy and reliability. Guidance documents could be adapted to cater for such novel technologies. The use of satellite data for surveillance and operational monitoring has for example great potential to better standardise collection of specific types of data across Europe and enhance confidence in WFD classification by enhancing both spatial coverage and frequency of monitoring of variables. Currently there are several ongoing projects developing satellite products for WFD monitoring from the European Space Agency's Copernicus programme[210]. Furthermore, the growing use of citizen science and smartphone applications can not only provide greater coverage and potentially reduced costs, but can also deliver greater public understanding and engagement in water management[211]. Significant progress has also been made on monitoring aquatic ecosystems using automated sensor technologies and flying, floating and submerged drones equipped with multi-sensors[212].

Surveillance vs operational monitoring

The distinction made in the WFD between surveillance and operational monitoring has led, in some cases, to double reporting of monitoring sites which are used for both purposes. As surveillance and operational monitoring are often included by Member States in different monitoring programmes, which are not necessarily fully coordinated, this distinction may also lead, in some cases, to a sub-optimal use of monitoring sites.

A simplification of the types of monitoring required by the WFD could have some limited impact in terms of resources needed for monitoring and reporting, reducing the likelihood of duplicating the reporting and providing an incentive for a better overall coordination of the monitoring effort. It would also eliminate the possibility for different interpretations of the monitoring requirements.

Alignment of reporting with other directives

One way to reduce the administrative burden of reporting is by making cross-references and using available data for several purposes. For example, several reporting elements have been aligned between the WFD and the Marine Strategy Framework Directive (MSFD), with a common typology of measures being used for the two directives. Another example is the streamlining between the RBMPs and the EEA's State of Waters report, through which all spatial data on river basin districts and sub-units, water bodies and environmental monitoring sites are now managed jointly and have to be reported only once when common to the two reporting flows. Nonetheless, in some cases differences in data requirements can be justified because of differences in the Directives' objectives and provisions in the same policy area.

[210] E.g. EOMORES www.eomores-h2020.eu; CYMONS https://business.esa.int/projects/cymons; CHLO4MSFD http://chlo4msfd.azti.es/; EUNOSAT: Joint Monitoring Programme of the EUtrophication of the NOrth-Sea with SATellite data.

[211] E.g. www.brc.ac.uk/app/bloomin-algae-app; www.ub.edu/fem/index.php/ en/inici-riunet-en or EU Project groundtruth2.0 http://gt20.eu/.

[212] Duffy et al (2018).

There are some examples, however, where similar data are being requested, reported and published separately. The assessment of action programmes (or derogations) under the Nitrates Directive requires more detailed and specific data linked to pollution than the more generic need under the Water Framework Directive, which looks at all sources of nutrient pollution. The reporting also happens at different times, not allowing for the direct use of information reported under one directive to provide data for the other. It is therefore important to coordinate these reporting processes better and improve communication of the results to the public in order to explain the differences in a better way[213].

However, according to the fitness check of reporting and monitoring of EU environmental policy there are limits on how far reporting can be streamlined. One reason for this is that less frequent reporting would lead to reduced information benefits and would jeopardise the Directives' correct application and enforcement. More importantly, however, Member States may not have the capacity to carry out all reporting at the same time. Overall, this may only lead to rather limited savings. For example, savings have been estimated at €159,000 if the reporting cycle of the Nitrates Directive and the Urban Waste Water Treatment Directive were to be aligned with the WFD cycle[214].

Modernisation of data management and digital transformation of the water community

In some cases Member State authorities have not yet sufficiently modernised their data and information management; doing so would contribute to delivering on the efficient implementation of the Directives. Some Member States have started initiatives in the context of the 2016-2020 EU eGovernment action plan[215], which has helped them to minimise administrative burden. Work is also ongoing in the research community to set out the necessary steps the water community needs to take to ensure digital transformation[216].

Simplification of the reporting process

The majority of respondents in the public consultation (60%, n=461) consider that the current reporting needs to be revised, improved or simplified. Of the respondents indicating they consider this to be the case, the highest proportion is among EU citizens (34%) and industries (18%), public authorities (15%) and industry associations (12%). Overall, the survey respondents highlighted that while reporting and monitoring are essential to implementing the vision and ambitions of the Directives, the reporting system in place is complex. Reporting systems also require a very large amount of data and are resource-intensive, requiring significant human and financial resources. At the same time, the positive role of the common implementation strategy in establishing and streamlining reporting procedures has been noted. Input from NGOs in the public consultation (additional comments) pointed to significant differences in the information to be reported between WISE and the RBMPs, noting that there is scope to improve the efficient use of resources.

Simplification of the reporting process is ongoing, as described above, mainly to avoid the need to report every 6 years information that does not change over time, such as the spatial location of different features (RBDs, water bodies, monitoring points), and to avoid repetition of data in different parts of the report.

[213] European Commission — SWD(2017) 230.
[214] ICF, IEEP and Denkstatt (2017).
[215] https://ec.europa.eu/digital-single-market/en/european-egovernment-action-plan-2016-2020
[216] See e.g. the Digital Single Market for Water services Action Plan developed by EU funded ICT4Water FP7 & H2020 projects' cluster: https://www.ict4water.eu

One case in which significant progress has been made concerns reporting on the implementation of measures. Due to large differences in the way individual measures were defined by different Member States, the information on the implementation of those measures was in many cases very complex, and it was almost impossible to draw conclusions from them. For the second RBMPs, an agreed set of key types of measures was developed, allowing for the grouping of all measures into a relatively small number of key types, which then formed the basis for the reporting on implementation.

Similarly, a number of common indicators has been defined for the assessment of the gap to good status and of the contribution of measures to fill that gap. Although Member States have the possibility to report additional indicators they regard as more appropriate in their situation, this common set of indicators has significantly improved the Commission's capability to aggregate data from different Member States.

For the Floods Directive, the reporting guidance for the second implementation period (2016-2021) has been updated by the Commission in close cooperation with the Member States. This has led to a significant reduction in terms of textual information to be provided by the Member States and the introduction of predefined lists of options to choose from.

Harmonisation of spatial data

In addition to the more permanent character of spatial data, mentioned above, which enables Member States to avoid having to repeat the same information every 6 years, spatial data also plays a major role in the ability to jointly analyse information from different sources. However, as the reporting under different obligations is generally managed by different organisations in the Member States, the spatial data reported under them were generally not harmonised and were presented in ways which were not compatible among each other. For this reason, the Commission and the EEA have been working on harmonising the spatial data reported under different reporting requirements (EU directives, 'State of Environment' voluntary requirement to the EEA).

This harmonisation has already led to the merger of the spatial databases for the WFD, the 'State of Environment' reporting and the Bathing Water Directive. It will also be gradually expanded to other instruments. In a more limited way, some harmonisation has been reached with the UWWTD and the Habitats and Birds Directives concerning reporting on protected areas relevant to the WFD.

In addition to this work on harmonisation of spatial reporting, the EEA is currently working to replace its current Reportnet system with a new generation system, Reportnet 3.0, which is expected to enable a much higher degree of coordination. Together with the full implementation of the INSPIRE Directive, this should eventually lead to the replacement of most of the formal reporting to the Commission/EEA with the availability of all the information at national level through INSPIRE-compliant 'services', which can be used by the Commission and the EEA to extract all the information needed for the assessments.

Public consultation

As discussed in the section on effectiveness, the requirement to hold public consultations on the RBMPs and FRMPs has increased public participation and led to tangible changes to the plans (see Section 5.1.2). While the requirement of public consultation as such was not challenged in the public consultation, a position paper from a group of Member States' Water

Directors ('Consultation group') argued that the public consultation requirements should be less prescriptive, e.g. allowing more flexible consultation periods. The need for publicly understandable information is also mentioned in this regard. Respondents to the NGO campaign acknowledged that the public consultation requirement has led to a substantial improvement in transparency and public participation, but they also indicate that the consultations insufficiently involve environmental groups and the general public. This is particularly relevant as 98% of the respondents involved in the campaign are members of the public. In their contributions to the public consultation, environmental groups and representatives of the water sector also pointed to the importance of being involved at an early stage in the RBMP development process, while the first group also highlighted the need to have access to background documents

5.3. Coherence

The coherence analysis assesses the Directives'

- 'internal' coherence, meaning the assessment of how different components of the intervention operate together (Section 5.3.1);
- 'external' coherence, meaning the Directives' interaction with other interventions at EU level (Section 5.3.2); and
- coherence with the EU's international obligations (Section 5.3.3).

The analysis in this section is supplemented in Annex 5.

5.3.1: 'To what extent is the legislation coherent internally?'

Overall response:

Having been devised in sequence and in a way that is complementary to each other, the WFD, EQSD, GWD and FD for the most part form an internally coherent package. Their introduction reduced the number of different EU water acts.

The main issue identified on internal coherence relates to chemicals, specifically to the distinction made between 'priority substances and certain other pollutants', which are listed at EU level and included in the chemical status, and 'river basin-specific pollutants' (RBSPs), which are listed at Member State level and included in the ecological status. The variability in the RBSPs is broader than can be explained by location-specific conditions, and there are significant differences between the environmental quality standards set by different Member States for the same substances. This is an example of an issue where the flexibility left to the Member States has led to sub-optimal results.

The WFD, complemented by the EQSD and GWD, introduced streamlining and simplification

Achieving greater policy coherence within European water policy was a key reason for introducing the Water Framework Directive. Indeed, the Water Framework Directive has brought about a very significant streamlining and simplification of EU water legislation, progressively reducing[217] the number of Water Directives from 18 to 9. As such, the Directive has eliminated potential double requirements in the field of water legislation and considerably reduced the risk of contradiction between different instruments.

[217] Until 2013, see Article 22 of the Water Framework Directive.

The EQSD and GWD were introduced after the WFD to complement it by providing specific requirements that were not spelled out in detail in the WFD itself (regarding the list of relevant pollutants, the setting of threshold values for chemical status, monitoring, assessment of trends and the drawing up of measures for groundwater).

Therefore no major issues of incoherence have been found with regard to how the different components of the Directives' respective intervention logics operate together.

Of those respondents to the public consultation who answered on this point, 75% considered the Directives to be mostly or fully coherent internally[218].

The Water Framework Directive and the Floods Directive

The WFD and the FD have a high level of synergy between them. The FD contributes to the objectives of the WFD by reducing the risks from floods to the aquatic environment, e.g. from polluting substances carried by floodwaters. Conversely, WFD measures to restore the hydromorphology of water bodies can contribute strongly to reducing flood risk. The re-meandering of rivers reduces the speed of water flow (by forcing the river to run in curves) and increases the length of the river and consequently the volume of water it is able to carry. In cases where there are conflicts between the objectives of the FD and the WFD, e.g. when modifications to water bodies are necessary to protect human lives and settlements from floods, the WFD has provisions enabling assessment of whether an intervention is properly justified and whether the mitigation of any negative effects is required[219].

The objectives and reporting cycles of the FD are aligned with those of the WFD. In practice, coordination between the WFD and the FD takes place in several ways: a few Member States have prepared joint plans, and in at least nine Member States, the FRMPs describe measures in terms of their WFD objectives. In more than half of the Member States, consultations on the draft FRMPs and RBMPs were carried out together, while in nearly all Member States the same authorities prepared both plans, and almost all Member States designated units of management under the FD corresponding to the RBDs designated under the WFD. During the targeted consultation, two Member State representatives and NGOs commented that there are some potential shortcomings in implementation, in particular in ensuring that the measures taken to implement the WFD and FD are coherent in achieving each other's objectives.

Despite the overall conclusion that the four Directives are largely coherent with one another, a few inconsistencies were identified.

Priority substances vs river basin-specific pollutants

The main area where the Directives lack coherence is in relation to chemicals, in particular the distinction made in the WFD between 'priority substances and certain other pollutants', which are listed at EU level and included in chemical status, and river basin-specific pollutants (RBSPs), which are listed at Member State level and included in ecological status.

[218] NGOs appear to find the Directives more fully coherent internally than the average respondent does. Most of the respondents who viewed the Directives as not coherent are EU citizens.

[219] In the past, the Commission and Member States produced a document on the links between the FD and the WFD. A document on the links between the FD and the Nature Directives is in preparation. https://circabc.europa.eu/ui/group/9ab5926d-bed4-4322-9aa7-9964bbe8312d/library/a2edd7d0-8d12-4550-a8de-9579423b457c?p=2&n=10&sort=modified_DESC

The table below gives an overview of the main differences:

	Priority substances	River basin-specific pollutants
Scope	EU-wide	River basin-specific
Legal basis	Listed in Annex X to the WFD; corresponding EQS set in the EQSD, updated every 6 years	Identified by Member States based on WFD Annexes II (1.4 Identification of pressures) and VIII (Indicative list of the main pollutants); corresponding EQS set following Annex V (1.2.6) as updated by CIS Guidance Document No 27
Deadlines	2015, 2021 or 2027 depending on the date of inclusion in Annex X to the WFD/date of any tightening of the EQS	2015 with possibility of exemptions until 2027
Contributes to	Chemical status (2 classes)	Ecological status (5 classes)
Inventory of emissions	Required for priority substances and 8 other pollutants	Not required

While the flexibility to leave the definition of RBSPs to the Member States is justified based on differences in legacy pollution, current polluting activities or natural background concentrations, the second-cycle RBMPs show a larger variability than can be explained by location-specific conditions. Indeed, although some Member States have a considerable number of common challenges, the number of RBSPs identified by the Member States ranges from 2 to more than 100 substances listed nationally. In many cases, RBSPs have been selected because monitoring data already existed or because there had been a significant problem with a given substance in the past[220].

Member States should use a harmonised methodology[221] to derive EQSs for (potential) RBSPs, but they often derive different EQSs for the same substance. This means that they do not consistently identify all relevant substances as RBSPs[222], or do not report the same extent of failure to meet the EQSs for the relevant RBSPs, even when a substance is present at the same concentration[223]. This is an instance where the flexibility left to the Member States leads to sub-optimal results. This is also a case of incoherence that several stakeholders (including industry associations and one Member State representative) mentioned in the consultation. The fact that the legal deadline for meeting the environmental quality standards for RBSPs cannot be adapted does not encourage Member States to add substances to their lists, even though it is important to regularly update the lists of substances based on up-to-date knowledge.

The role of hydromorphological quality elements in the assessment of ecological status

A further point of incoherence in the WFD concerns the role of hydromorphology in determining the ecological status of water bodies. In contrast to the physico-chemical quality elements, which are explicitly required for the classification of good and high ecological status, the hydromorphological quality elements are explicitly only required for the

[220] Wood (2019).
[221] CIS (2018) Guidance Document No 27.
[222] Because they may not identify a risk at all if the EQS is less stringent.
[223] There are also differences in the way Member States have distinguished between priority substances and RBSPs in their reporting.

classification of high status. This has led to differences in the way Member States have used those elements for status classification and in the information reported. For example, a significant number of Member States have not reported any assessment results for hydromorphological quality elements in their second RBMPs. This is problematic because the assessment of supporting quality elements for each class is necessary for several important aspects of the implementation. For example, defining ecological flow is necessary for the development of appropriate measures.

5.3.2: 'To what extent is the legislation consistent with wider EU policy?'

Overall response:

There are a multitude of links between the legislation under this fitness check and other EU laws and policies.

The Directives are broadly coherent with the other parts of the EU's water *acquis*. The measures set under the Drinking Water, Urban Waste Water Treatment and Nitrates Directives are listed in Annex VI to the WFD as 'basic measures'. If fully implemented, they should contribute to achieving the WFD objectives, along with the additional 'supplementary measures' also laid down by the WFD. Similarly, the WFD and Marine Strategy Framework Directive are interlinked and complementary.

As regards wider environmental policy, there is overall strong coherence and complementarity, even though there is still room to increase synergies and streamline implementation, for example with (other) EU chemicals legislation.

Concerning EU sectoral policies, progress has been made on better integration of water-related issues thanks to the adoption of the water legislation and of instruments to reduce the impacts of economic activities on water. However, there are still issues of incoherence with sectoral policies, which can hinder the achievement of the objectives of the WFD and daughter directives; areas identified include agriculture, energy and transport. These issues could be related to a lack of integration between policies at early stages of the strategy development or the planning processes. Full integration of the WFD and daughter directives' objectives into the strategic orientations and incentives of the economic sectors responsible for the main pressures on water is not yet fully achieved, and in some sectors would require a paradigm shift in approach.

Given the omnipresence of water in nature and the economy, there are many interactions between the Directives covered by this fitness check and other pieces of EU legislation. This section first assesses coherence with the other pieces of EU water legislation, then coherence with other environmental policies, and finally coherence with other sectoral policies. The analysis of this section is complemented by Annex 5. For coherence with other EU water legislation, Annex 5 includes additional information on the Marine Strategy Framework Directive and the Maritime Spatial Planning Directive. For coherence with other environmental policies, it covers nature and biodiversity, the strategy for climate change and the green infrastructure strategy, chemicals, industrial emissions, air quality, waste and sewage sludge and soil protection. Finally, for coherence with other EU policies, Annex 5 includes complementary information on agriculture, transport — inland navigation, the Union Civil Protection Mechanism, fishing and aquaculture, and non-energy extractive industries.

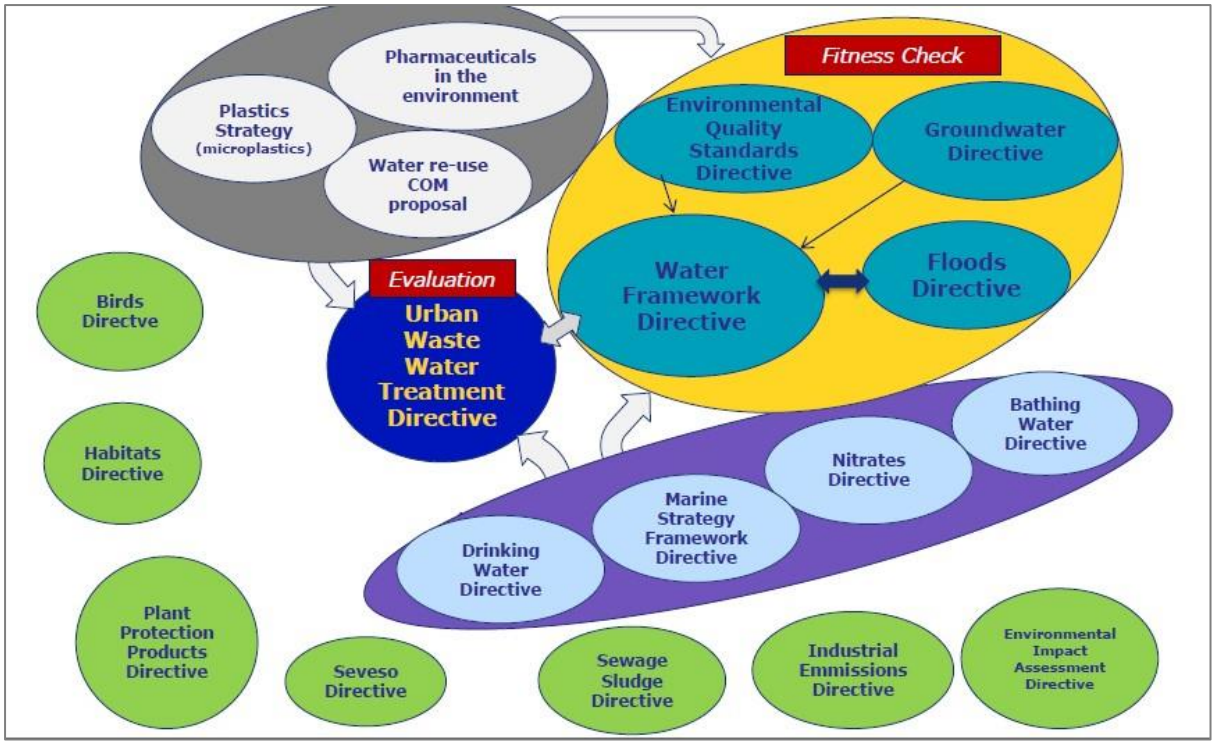


Figure 20: Interlinkages between the Directives subject to this fitness check and the most relevant pieces of EU legislation

Consistency with other components of the EU's environmental legislation affecting water quality

The WFD, its daughter directives and the FD address both environmental and human health protection. They are broadly consistent with the other parts of the EU's water *acquis*, such as the Drinking Water Directive (DWD[224]), the Urban Waste Water Treatment Directive (UWWTD), the Bathing Water Directive, the Nitrates Directive, and the Marine Strategy Framework Directive.

The objectives of these directives complement each other by addressing different aspects of water protection. The objectives of the Drinking Water and Bathing Water Directives address human health issues, while the objectives of the Nitrates Directive and the UWWTD (in turn complemented by the Sewage Sludge Directive[225]) focus on reducing pressures on the environment (nutrient enrichment, organic pollution and contamination by metals) and thus contribute to achieving the WFD objectives[226]. The implementation of these directives is part of the 'basic measures' under the WFD (see Section 2). However, the contribution of those measures to achieving the objectives of the WFD is not always assessed, even though it is crucial for planning supplementary measures under the WFD.

[224] Coherence with the Drinking Water Directive is addressed through the protection of sources of drinking water under the Water Framework Directive Article 7. While the standards in the Drinking Water Directive for nitrates and pesticides are explicitly included in the GWD in Annex I, this is not the case for surface water.

[225] See Annex 5 on Coherence — additional information on the coherence of water policy with wider EU policy.

[226] In particular, Article 10 of the WFD introduced the concept of the 'combined approach' that connects achieving the objective of good status with the control of diffuse and point pollution sources under the Urban Waste Water, Nitrates, Environmental Quality Standards and Industrial Emissions Directives. Article 6 of the WFD stipulates that Member States should make a register of protected areas. The register should include drinking water protected areas (DWPAs), areas covered by the Bathing Water Directive, Nitrates Directive (nutrient-sensitive areas) and Natura 2000 sites, and waters with economically significant aquatic species.

A few challenges in this wider framework of EU water legislation have been identified, these are set out below.

The Drinking Water Directive

The evaluation of the DWD[227] found no legal discrepancies between the DWD and WFD and GWD. However, it concluded that insufficient implementation of the WFD stands in the way of achieving the objectives of the DWD, despite the obligation for Member States to identify bodies of water for the abstraction of drinking water and to protect them in accordance with Article 7 of the WFD.

The parametric values (standards) for pesticides (individual and total) and for nitrates in drinking water are supported by identical quality standards in the GWD. However, EQSs for pesticides in surface waters are often different from the DWD and GWD individual pesticide standards because of the way in which they are determined, which among other things involves taking into account a treatment factor[228]. Furthermore, there is no standard for total pesticides in surface waters, which could mean that even if all individual EQSs are complied with, the total might exceed the drinking water parametric value, even when adjusting for the treatment factor. Furthermore, there are inconsistencies in the conception of and how to deal with relevant and non-relevant metabolites as defined in Article 3(32) of Regulation (EC) No 1107/2009 on the placing of plant protection products on the market. In the consultation, representatives from the water service companies pointed to insufficient implementation of the polluter pays principle. They stated that the need to treat drinking water is increasing, which comes at a cost to consumers.

The DWD recast proposal[229] includes a new specific hazard assessment of areas used for the abstraction of drinking water[230], while its provisions seek to clarify obligations and increase coherence between the DWD and the WFD.

The Nitrates Directive

The Nitrates Directive aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices. It requires Member States to establish a voluntary code of good agricultural practices and a mandatory action programme, which is applied within nitrate vulnerable zones (NVZs).

The main challenge regarding the interaction between the WFD and the Nitrates Directive lies in implementing the legislation rather than in the legislative framework itself. While

[227] REFIT evaluation of the Drinking Water Directive 98/83/EC
http://ec.europa.eu/environment/water/water-drink/pdf/SWD_2016_428_F1.pdf

[228] The EQSs for priority substances are set on the basis of the most sensitive protection goal. This goal is often aquatic wildlife, and the standards are often stricter than the DWD standards for the same substances. For substances where the most sensitive protection goal is human health via drinking water, CIS Technical Guidance Document No 27 (2018) explains how the EQSs should be calculated. It states that 'A treatment factor should be applied to the drinking water threshold so that the QSdw, hh relates to the 'raw' water (i.e. it is an 'environmental' standard). Drinking water thresholds and treatment processes used to achieve them should be taken into account in determining quality standards for water abstraction resources. This should have regard to Article 7 of the WFD with reference where appropriate to simple treatment.' The guidance document favours the use of the WHO drinking water guideline value as the threshold if different from the DWD parametric value.

[229] European Commission COM(2017) 753 final.

[230] To avoid any duplication of obligations, when Member States carry out the hazard assessment they are required to make use of the monitoring and measures performed under the WFD.

Member States can in theory adopt compulsory measures outside the NVZs and deadlines in order to meet the WFD objective, in practice this is not often done. Furthermore, there is also some inconsistency between the designation of NVZs (and sensitive areas under the UWWTD) and the assessment of ecological status. This is because not all Member States link the assessment of 'eutrophication' required by the Nitrates Directive with WFD ecological status. To improve coherence and consistency, a CIS guidance document was published in 2009 on the assessment of eutrophication[231]. Nonetheless, reporting under the Nitrates Directive in 2016 showed that the methodologies used to assess eutrophication still varied widely among Member States and often were not well linked to the WFD quality elements[232]. Efforts are continuing to improve coherence and synergies at Member State and EU levels.

Expert stakeholders in the public consultation also noted, including in some position papers, that effective implementation of the GWD requires full implementation of the Nitrates Directive.

The Urban Waste Water Treatment Directive

The UWWTD has been evaluated in a parallel process to this fitness check. The separate evaluation finds that while the UWWTD and WFD take different approaches to water management and tackling emissions to water, there is no legal incoherence that undermines the achievement of the objectives of either piece of legislation. Implementing the UWWTD helps Member States reach their objectives under the WFD[233].

However, the UWWTD evaluation also found that insufficient implementation of the UWWTD limits how effectively it can contribute to achieving the WFD objectives[234]. About 12% of all surface water bodies fail to meet good status due to waste water pressures.

The Marine Strategy Framework Directive

The WFD and the Marine Strategy Framework Directive are coherent with one another and complementary. As the MSFD was introduced after the WFD, in 2008, its drafting was able to follow a similar structure to the WFD and complement its content. There are geographical overlaps between the MSFD and WFD; coastal waters are covered by both, and territorial waters are covered by both as regards priority substances[235]. The Directives have complementary objectives: good status (ecological and chemical) under the WFD and good environmental status[236] under the MSFD. To ensure consistency between the objectives and

[231] CIS (2003) Guidance Document No 23.
[232] European Commission (2018) — COM (2018) 257 final.
[233] Annex I to the UWWTD states that more stringent treatment needs to be applied to waste water when this helps to ensure that the receiving waters satisfy the objectives of any other relevant directives.
[234] Reaching the objectives of the WFD depends on the basic measures being fully implemented and on those measures functioning well. For instance, the UWWTD evaluation has shown that where and when the Directive is fully implemented, it has been effective at dealing with urban waste water. According to the latest reporting data under the UWWTD, implementation levels reach an EU average of 80-95%, although the average hides substantial diversity among Member States' implementation levels. However, the UWWTD evaluation has shown that the Directive has some shortcomings, for example in how it addresses storm water overflows and individual and other appropriate systems. These shortcomings translate into pressure to surface waters; 4% of EU surface water bodies fail good ecological status, with storm water overflows being one of the reasons for this.
[235] WFD chemical status is applicable out to 12 nautical miles, while WFD ecological status is applicable only out to 1 nautical mile.
[236] There are 11 MSFD descriptors determining good environmental status; these cover ecological and chemical issues as well as marine litter and noise.

status assessments, the MSFD clearly specifies that Member States must use WFD assessment criteria and follow WFD requirements in the overlapping areas[237]. Around 30% of the measures to achieve the MSFD objectives are planned in the RBMPs, and the MSFD and WFD use some similar quality elements.

In practice, some challenges have been encountered. For concentrations of contaminants, Member States have to consider the priority substances and RBSPs already identified under the WFD. However, they can also draw up a list of additional contaminants that may give rise to pollution effects[238]. This was done in the 2018 MSFD reporting cycle, in which the 2016 WFD assessments in coastal and territorial waters were reused[239]. The fact that some Member States used their corresponding Regional Seas Convention (RSC) assessment instead of the WFD data for some descriptors is an indication that those Member States do not find the WFD results sufficiently compatible with their offshore assessments. This suggests a possible need to align the methodologies and quality thresholds used under the WFD and by the RSCs. Some expert respondents involved in consultation[240] stated that some EQS values used under the WFD are not appropriate for marine waters[241], although the EQSD does distinguish between inland and other surface waters.

A further area is sediments. Sediments are transported from river basins to marine areas, but in many river basins there are insufficient or no management measures for sediments at river basin level. This can be an issue for marine habitats when the supply of sediment is insufficient to prevent or compensate for coastal erosion. The MSFD status assessment places specific emphasis on contaminants in sediments. In contrast, the WFD, while allowing Member States to set EQSs for sediments, addresses such contamination primarily in the context of the trend-monitoring requirement under the EQSD. Some stakeholders, in particular from the navigation sector, expressed concern that the interplay between the WFD and MSFD does not function well enough on sediment management.

Further information is included in Annex 5.

Coherence with other EU policies addressing environmental protection

The WFD and FD are closely linked with other environmental directives and policies, such as those on nature and biodiversity, chemicals and air quality. As the objectives of EU water policy contribute to those of other EU environmental policies and vice versa, they should be implemented in a synergetic way[242].

[237] For eutrophication and contaminant assessments, MSFD descriptors 5 and 8.

[238] As stated in the MSFD Commission Decision 2017/848 of 17 May 2017 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU.

[239] As required by Decision (EU) 2017/848.

[240] Information from interviews (with representatives from the navigation sector, the Regional Sea Convention and others).

[241] For example, concerns were raised that it may not be appropriate to use food standards when other toxicity data are not available, and that when biota standards are applied there are differences in the corrections applied for 'trophic level' (how far up the food chain the sampled organism is) and in whether whole organisms or only certain tissues are analysed.

[242] Coherence with EU climate action is discussed in Section 5.3.3 and Annex 5, which complements the analysis of this section; in addition, climate change and its links to the Directives covered by this fitness check is discussed in Section 5.4.1.

Nature and biodiversity

The WFD and the EU's nature and biodiversity policies and legislation are fully coherent with each other, and have mutually supportive objectives. Water bodies with good ecological status, for example, create resilient and healthy ecosystems that support rich biodiversity, and which also make aquatic ecosystems better able to withstand the presence of invasive alien species. The WFD requires the objectives of the Nature Directives to be fully taken into account in river basin planning and other water management decisions to be fully consistent with objectives for protected areas[243].

The EU biodiversity strategy sets targets for ecosystem restoration that are consistent with the objectives of the WFD and that contribute to the protection of freshwater ecosystems in the broader EU biodiversity protection context. Some conflicts have been mentioned in the implementation of the WFD and the Nature Directives in specific cases.

Information exchanges at EU level during the implementation of the WFD, FD, MFSD and Nature Directives have become common[244]. A process has been established to periodically bring together the heads of EU and national administrations to discuss ways to enhance synergies and avoid potential conflicts. Further information is included in Annex 5.

Synergies with the FD occur through the implementation of natural water retention measures. These aim to protect and manage water resources using natural means and processes by replacing grey infrastructure (e.g. dams or dykes) with green infrastructure (e.g. floodplains restoration). This also has a positive impact on protected habitats and species. Further information is included in Annex 5.

An integrated approach to protecting the sturgeon

An example of integration between several policies is the protection of the sturgeon. Once abundant in many European rivers and adjacent coastal areas, the sturgeon is today among the most threatened species at global scale and is facing extinction in Europe. Concerted EU action has been launched to react to this problem, where the WFD's objectives are being pursued in coordination with and complemented by other EU laws (the UWWTD, the Nitrates Directive, the MSFD, Nature Directives, Wildlife Trade Regulations and CITES), policies (biodiversity strategy, common fisheries policy, macro-regional strategies), EU funding instruments (LIFE, ESI Funds including Interreg[245]) and awareness-raising activities via the #EU protects campaign. A concrete case of such action is the International Commission for the Protection of the Danube River (ICPDR), which is searching for solutions to manage dams that prevent the migration of sturgeon and other fish species in the Danube River Basin. With EU funding, the ICPDR started the work on a feasibility study analysing options for fish (i.e. sturgeon) migration and conservation at the Iron Gates.

[243] See e.g. Article 6 WFD and Annexes IV and VI, which contain explicit cross-references to protected areas mentioned in the Nature Directives.
[244] European Commission (2015) - Workshop Summary Report.
[245] Interreg provides a framework for joint action between Member States to address common challenges such as water management, including opportunities for cross-border, transnational and interregional cooperation, https://ec.europa.eu/regional_policy/en/policy/cooperation/european-territorial/

Chemicals

The European framework of legislation on chemicals includes more than 40 policies, covering all aspects of the lifecycle of chemicals produced in and imported into Europe. It aims to protect human health and the environment from hazard and risks, thus contributing to achieving the objectives of the WFD, EQSD and GWD. No major incoherences between water and EU chemical legislation were found in the analysis carried out for this fitness check; this was confirmed by the feedback from stakeholders including public authorities and the chemicals industry[246]. However, the need for a more coordinated approach in implementation was identified.

Much of the EU's chemicals legislation concerns the authorisation, approval or management of substances for particular uses. In this respect, it is 'upstream' of the WFD, and critical as a tool for controlling 'at source' the presence of chemical pollutants in the aquatic environment, by reducing or phasing out emissions. The WFD and its daughter directives can, by ensuring comprehensive monitoring, inform decisions taken under the upstream legislation, and thus strengthen management measures. [247]

There are formal links between the WFD and the EQSD and several pieces of chemicals legislation. Under the WFD, the identification of substances posing a significant risk to or via the aquatic environment (the priority substances) has to take into account the risk assessments carried out under the REACH Regulation, the Plant Protection Products Regulation and the Biocidal Products Regulation[248]. Conversely, those pieces of legislation are required to take account of the monitoring of substances under the WFD, EQSD and GWD, and of the overall objectives of the WFD. If necessary, the management measures in place for particular substances should be reviewed to ensure that quality standards are met and emissions phased out if relevant. This ensures extensive coherence. The Classification, Labelling and Packaging (CLP) Regulation aims to ensure that risks to the environment or human health from using chemicals are minimised. For example, the labelling under the CLP Regulation identifies substances that are toxic to the aquatic environment.

In terms of coherence between EU chemicals legislation, the WFD was referred to in the recent fitness check of the chemicals legislation except REACH[249] as a piece of legislation covering chemical risk assessment and risk management measures. The chemicals fitness check noted that the act of listing a substance as a priority substance does not in itself trigger action under other legislation, and that there may be no action in response to monitoring data until a substance is up for renewal, resulting in delay. The chemicals legislation fitness check also highlighted that risk assessment data linked to the authorising legislation are not always available for the priority substances review. The chemicals fitness check did, however, note that efforts are under way more widely in the EU to bring together risk assessment processes to avoid duplication of effort and to reduce the likelihood of divergent conclusions.

Regarding the evidence on the overall body of chemicals legislation, the chemicals fitness check concluded that targeted EU policy and regulatory action on chemicals has resulted in successful reduction or, in many cases, minimisation of human and environmental exposures to a number of well-known individual hazardous chemicals (e.g. Tributyltin, TBT). However,

[246] This includes feedback received during specific interviews and workshops.
[247] EEA Report 7/2018.
[248] Co-formulants should be considered as well as active substances.
[249] European Commission (2019) — COM(2019) 264 and SWD(2019) 199.

there are some ongoing concerns including the widespread occurrence of persistent harmful substances such as polybrominated diphenyl ethers and the risks from exposure to mixtures of chemicals.

On the designation of persistent, bioaccumulative and toxic (PBT) and very persistent, very bioaccumulative (vPvB) substances, the chemicals fitness check concluded that there may be inconsistencies in the conclusions drawn from different pieces of legislation. These inconsistencies are due to differences in the range of information taken into account: the WFD process takes into account a very wide range and the evaluation relying on expert judgement, whereas the Plant Protection Products Regulation takes a more narrow approach.

The possibility for the pharmaceuticals legislation to contribute to controlling emissions at source is mentioned in the EQSD, but there is no reference to the WFD objectives in the legislation on human or veterinary medicinal products. The pharmacovigilance legislation[250] refers to examining the scale of the problem of pharmaceuticals in the environment. This was reinforced by the obligation in the EQSD amendment of 2013 to adopt a strategic approach to pharmaceuticals in the environment, complementing the EQSD. The approach was translated into a communication[251] in March 2019, identifying actions that could be taken under the pharmaceuticals legislation to reduce emissions to the aquatic environment.

The Sustainable Use of Pesticides Directive[252] aims to reduce the risks from pesticide use to human health and the environment and to promote integrated pest management. Overall, the legislation is coherent with the WFD and its proper implementation should contribute to achieving the WFD's objectives. However, assessment of the Member States' national action plans shows weaknesses in the implementation of integrated pest management and no robust strategy to reduce the use of pesticides. This compromises the ability of the Sustainable Use Directive to reduce water pollution.

The Detergents Regulation and Fertilisers Regulation have recently been evaluated[253]. The Detergents Regulation[254] has achieved improved biodegradability of detergent products and reduced the phosphorus content of detergents, thus reducing the discharge of phosphorus into surface waters, but it has not yet been possible to say how far this has reduced eutrophication. A recent evaluation of the Fertilisers Regulation[255] looked at whether the Regulation sufficiently addresses the presence of contaminants that could run off into surface waters or leach into groundwater. The resulting proposal[256] led to a new regulation[257] which includes limits on the level of cadmium and some other metals in fertilising products, as well as limits on polyaromatic hydrocarbons. It remains to be seen how far the new restrictions will improve the status of water bodies that currently fail to achieve good status due to the presence of these substances.

Further information is included in Annex 5.

[250] Regulation (EU) No 1235/2010, Regulation (EC) No 726/2004 and Regulation (EC) No 1394/2007.
[251] European Commission (2019) — SWD(2019) 128.
[252] Directive 2009/128/EC.
[253] European Commission (2019) — SWD(2019) 298 and SWD(2019) 299.
[254] Regulation (EC) No 648/2004.
[255] Regulation (EC) 2003/2003.
[256] European Commission (2016) — COM(2016) 157.
[257] Regulation (EU) 1009/2019.

Industrial Emissions Directive

The Industrial Emissions Directive (IED[258]) requires Member States to prevent or reduce industrial emissions and their impact on the environment. It includes in Article 18 an obligation to set stricter permit conditions if necessary to achieve compliance with (existing) environmental quality standards, a requirement corresponding to Article 10 of the WFD[259]. Several Member State representatives have expressed concern that it is difficult to have conditions that are stricter than the best available technique-associated emission levels (BAT-AELs) set under the IED, which are not always sufficient. Some industrial sectors say they have encountered difficulties obtaining permits for new activities. These and other issues were discussed at a workshop on the implementation of the WFD and IED[260].

In the public consultation, 305 stakeholders considered coherence with industrial emissions policy, out of which 112 described it as fully coherent (37%), 98 as partially coherent (32%), 35 as neither coherent nor incoherent (11%) and 60 as incoherent (20%[261]).

The ongoing evaluation of the IED will complement these discussions and the findings of the present fitness check, including as regards whether water should be better addressed in the best available techniques reference documents.

Linked to the IED, the Regulation on the European Pollutant Release and Transfer Register (E-PRTR[262]) requires registration of emissions. The Regulation refers to the WFD priority substances, and Member States can use the registration exercise for their inventories of emissions under the EQSD. However, additional information is also needed because of the thresholds in the register and because not all sources are covered, in particular not all diffuse emissions.

Further information is included in Annex 5.

Air quality

There is a strong link between the EU policies on water and air quality[263], in particular because atmospheric deposition of chemicals and of nitrogen is identified as one of the pressures affecting water. It is important that Member States implement measures to meet the objectives in these two policy areas in an integrated manner so that overall emissions are reduced rather than shifted from air to water or vice versa. Feedback from expert stakeholders

[258] Directive 2010/75/EU.

[259] Recital 3 of the IED states the following: 'Different approaches to controlling emissions into air, water or soil separately may encourage the shifting of pollution from one environmental medium to another rather than protecting the environment as a whole. It is, therefore, appropriate to provide for an integrated approach to prevention and control of emissions into air, water and soil, to waste management, to energy efficiency and to accident prevention. Such an approach will also contribute to the achievement of a level playing field in the Union by aligning environmental performance requirements for industrial installations.'

[260] See Berlin Workshop: BAT for industrial waste water treatment and its contribution to water quality, Nov 2017 https://circabc.europa.eu/w/browse/2057802a-f097-4631-a42c-65399df53c5f

[261] The most positive groups (i.e. viewing the policies as fully coherent with one another) were citizens (35%) and NGOs (25%); the most negative groups (i.e. who see the policies as not coherent with one another) were business associations (31%) and company/business organisations (24%).

[262] Regulation (EC) No 166/2006.

[263] The EU clean air policy framework sets standards for air quality in the Ambient Air Quality Directive 2008/50/EC and in Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. It also sets national emission reduction commitments in the National Emission Ceilings Directive 2016/2284/EU.

noted that linking the standards for air with the objectives of the WFD and EQSD remains challenging, and a need for assistance to Member States and economic operators on this matter was identified.

An example of the shifting of pollution from air to water has arisen from the implementation of the Sulphur Directive[264], especially as tighter limits on the sulphur content of marine fuels have come into force. With ship owners increasingly opting for exhaust gas-cleaning systems ('scrubbers[265]') instead of low sulphur fuel, there is particular concern about the composition of the 'washwater' discharged in ports and other coastal waters, which includes PAHs, nitrates and heavy metals, some of which accumulate in sediments. The Commission and Member States have been looking at how to resolve the issues, including under the auspices of the International Maritime Organization's Marine Pollution (MARPOL) Convention. Concern has also been raised internationally about the consequences of discharges from the rising number of ships being equipped with scrubbers instead of using low sulphur fuel. The IMO recently agreed to launch an activity proposed by the EU to investigate whether the use of scrubbers should be restricted in sensitive sea areas.

Further information is included in Annex 5.

Strategic environmental assessment and environmental impact assessment

Strategic environmental assessment (SEA) and environmental impact assessment (EIA) contribute to improving coherence between the different public policies overall. The Commission's assessment report of the second river basin management plans found that most Member States carried out an SEA procedure for the RBMPs in all their river basin districts.

The WFD requires a specific environmental assessment under Article 4(7) for projects leading to failure to achieve the objectives of the WFD because of physical alteration. Some projects require both EIA assessment and Article 4(7) assessment. While the EIA Directive stipulates that streamlining of the EIA Directive and the Habitat Directive is mandatory, it is optional for the WFD. It is, however, recommended that WFD procedures be streamlined to improve efficiency, ensure consistency and reduce costs. Practical guidance and best practices are provided in different Commission guidance documents[266].

Whereas it is not a requirement in the FD that flood risk management plans undergo an SEA, most Member States' plans did also undergo an SEA in at least some of their units of management.

Coherence with other EU policies

Coordination with other sectoral policies and policy coherence has improved in many Member States thanks to the implementation of the WFD and its daughter directives. Nonetheless, as concluded by the EEA in its 2018 State of Water report, European waters remain under significant pressure from both diffuse pollution (e.g. agriculture, transport, infrastructure) and point source pollution (e.g. industry or energy production), as well as from over-abstraction and hydromorphological changes stemming from a range of human activities (see Section 3). This indicates that there is significant scope to better integrate the EU's environmental objectives for water into other sectoral policies.

[264] Directive 2016/802.
[265] These are allowed provided they have no significant negative impacts on the environment.
[266] CIS (2017) Guidance No 36 and European Commission — COM 2016/C 273/01.

Figure 21 sets out the detailed results of the public consultation on the question of coherence between the Directives covered by this fitness check and sectoral policies.

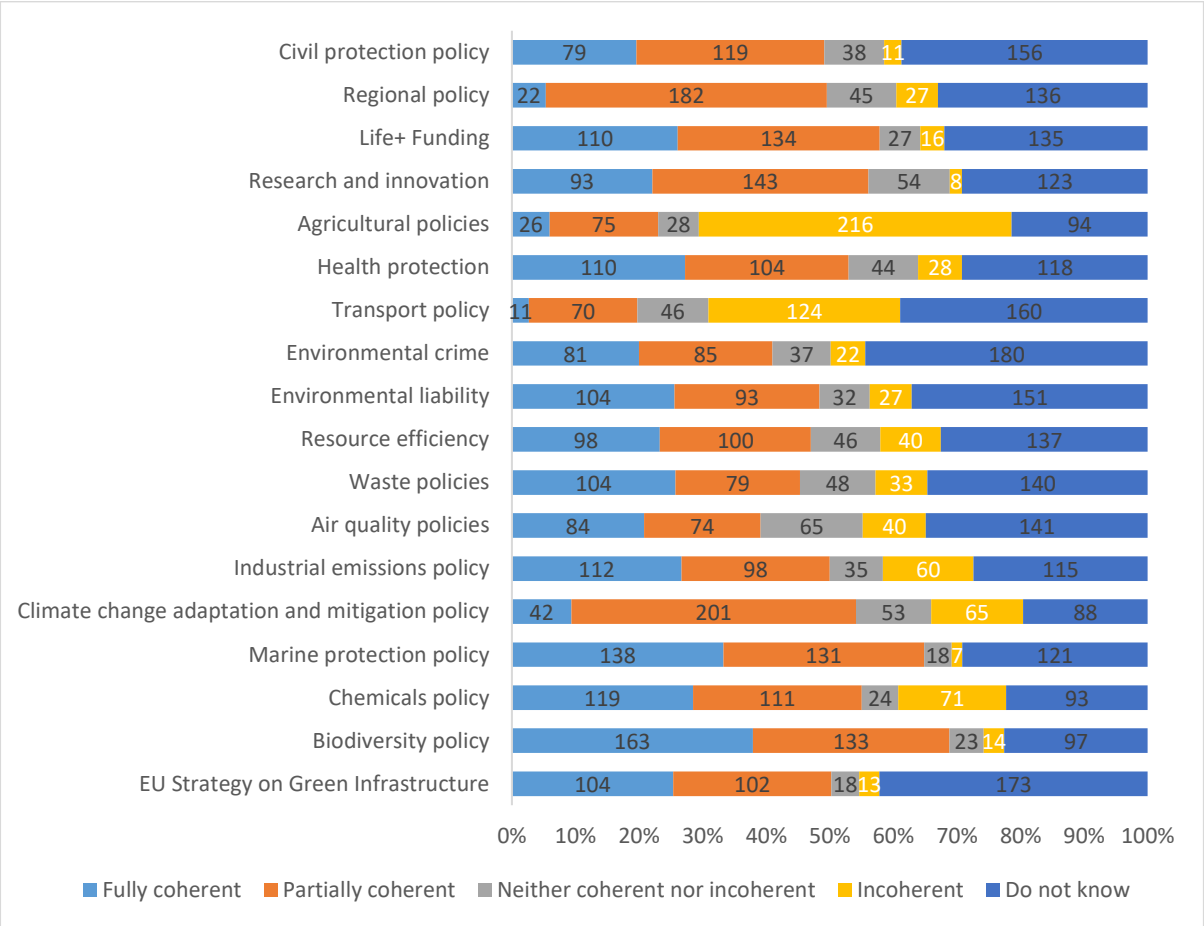


Figure 21: Results of the public consultation on the question of coherence between the Directives covered by this fitness check and sectoral policies (Source: Trinomics and Wood, 2019)

Agriculture

Agriculture is one of the main sources of pressure preventing water bodies from achieving good ecological status across Europe. This is mainly due to diffuse pollution of nutrients (nitrogen and phosphorus) and pesticides (see Section 3.1). Around 38% of the EU's surface water bodies are under pressure from diffuse pollution (of which agricultural production is a major source (25%)), from water abstraction for irrigation, and from hydromorphological changes (e.g. due to drainage). The delicate balance between agriculture and water-related objectives has been addressed at EU level by the evolving EU environmental and agricultural legislation[267]. Results from the public consultation show that agriculture is the sector rated with the highest rate of 'incoherent' replies (see Figure 21 above). Of those who replied 'incoherent', most were EU citizens (29%) and NGOs (21%).

While the interaction with the Nitrates Directive and the Sustainable Use of Pesticides Directive is certainly of importance (as discussed above), the main legal interaction is with the common agricultural policy. Overall, the WFD has helped facilitate better integration of

[267] European Commission (2017) — SWD(2017) 153.

water issues in the CAP, although the general perception is that there are many conflicts between the water protection objectives and agricultural policy. In the consultation, several groups of respondents (industry/economic organisations/trade unions, as well as NGOs and environmental organisations) stated: (i) that efficient implementation of the WFD required better integration of its objectives within the CAP; and (ii) the CAP does not sufficiently consider WFD obligations/objectives. Similar views were expressed as part of the targeted consultation where the lack of implementation of 'win-win' situations was highlighted by NGOs. Some competent authorities responding to the consultation highlighted the challenges involved in ensuring coherence between agricultural and water policies.

The CAP consists of two 'pillars'. The first pillar includes payments and market mechanisms to stabilise farm revenues, and remunerates farmers for environmentally friendly farming and delivering public goods not normally paid for by the markets. The second pillar concerns rural development policy, addressing the specific needs and challenges rural areas are facing.

With regard to the first pillar, instruments have been put in place to ensure coherence of the CAP's payments with environmental legislation, in particular through cross-compliance, which links CAP payments to compliance with EU legislation. As reported by the European Court of Auditors, six cross-compliance requirements have a direct impact on water quality and water quantity, while several other cross-compliance requirements have an indirect impact on water protection[268]. Cross-compliance has also improved awareness of environmental concerns among farmers, but its impact has been limited by the fact that it has not sufficiently integrated the WFD's objectives, as reported by the European Court of Auditors in 2014[269]. On this specific Court of Auditors statement, the Commission considers that 'remaining (beyond nitrates and pesticides) water-related issues should be addressed by Member States in fulfilling the obligations of the WFD … The relevant measures under the WFD will be introduced in due course into the scope of cross-compliance when the obligation at farm level is sufficiently clear.' That report also concluded that weaknesses in the implementation of EU water policy have hindered its integration into the CAP.

A 2016 European Court of Auditors report[270] shows that the effects of cross-compliance are also limited by the fact that not all farmers supported by the CAP have to comply with cross-compliance (approximately 68% have to comply). However, organic farmers are considered as 'green by definition' and small farmers are exempted from greening obligations due to the need for simplification and cost-benefit consideration[271]. Several standards present infringement rates of less than 1%, while the rate of non-compliance for the statutory management requirement stemming from the Nitrates Directive is 10%. This latter figure has been mainly attributed by the European Court of Auditors to the complexity of the instruments and deficiencies in controls[272]. The Commission considers that the number of infringements is not an appropriate indicator for the performance of cross-compliance. A high rate of non-compliance in a certain sector can also be an indicator that cross-compliance controls are effective.

[268] 2014, European Court of Auditors Special Report No 4/2014.
[269] European Court of Auditors (2014). Special Report No 4/2014.
[270] European Court of Auditors Report No 26/2016.
[271] European Court of Auditors Special Report No 21/2017.
[272] European Court of Auditors (2016) Report No 26/2016.

In 2015, a greening scheme was introduced for agricultural practices that are beneficial for the climate and the environment[273]. While the main focus of greening measures are biodiversity, soil and carbon sequestration, they also have benefits for water. A preliminary evaluation of this scheme of 'greening direct payments' was carried out in 2017[274]. The evaluation found that environmental priorities were not the main drivers influencing the choice of measures when Member States have the flexibility to do so, and that the impact of greening measures on the environment was often difficult to assess due to the lack of data. A report from the European Court of Auditors[275] shows that its impact on increasing the environmental performance of farms, and therefore on reducing pressure on water resources, has been limited. Indeed, while the area subject to greening covers 78% of all utilised agricultural area[276], the result in changes of practices is estimated at approximately 5% of farmland[277]. However, the Commission considers that the number of holdings affected is the best indicator of the impact of the introduction of the greening and in this respect the Commission notes that greening entailed changes for 13% of holdings as regards crop diversification and 37% of holdings as regards EFAs. In addition, greening is supporting the preservation of existing practices and areas (e.g. fallow land, protection of hedges, buffer strips, etc.) beneficial for the environment and climate.

However, there is still room for improvement in the implementation of the instruments and of the WFD in order to increase synergies. For this, a number of regulatory changes have been proposed by the Commission to enhance the environmental performance of the CAP, for example the ban of pesticides on ecological focus areas. In addition, a good level of consistency between RDPs and RBMPs is necessary to avoid negative side effects from water-related support[278]. The development of the required strategic plans under the next CAP will also offer an important tool for further integration and enhanced synergies. The proposal for the next CAP includes enhanced conditionality to be applied to all farmers. This includes several 'good agricultural and environmental conditions' that are important for water quality and quantity, and a specific WFD statutory management requirement. There is also better consideration of the objectives and needs of environmental policies, including the WFD.

The EU rural development programme, the second pillar of the CAP, has contributed significantly to the implementation of WFD, as it has been reported as the main source of funding for the programmes of measures in the second-cycle RBMPs. Conversely, a detailed assessment of rural development programmes for the period 2007-2013 shows that Member States have allocated 51% of their rural development programme budgets to measures that, to a greater or lesser extent, relate to water (€75 billion for 2007-2013[279]). Member States have implemented basic and supplementary measures within the programmes of measures. However, the supplementary measures are generally voluntary and the voluntary nature of these measures means that water issues may not be effectively addressed.

[273] European Court of Auditors (2016) Report No 26/2016.
[274] Alliance Environnement (2017).
[275] European Court of Auditors (2017): Special Report No 21/2017.
[276] European Commission — Final Report 2017.
[277] European Court of Auditors (2017): Special Report No 21/2017; The Commission considers that the number of holdings (not the area) affected is the best indicator of the impact of production.
[278] European Court of Auditors (2014). Special Report No 4/2014.
[279] European Court of Auditors (2014) Special Report No 4/2014.

The assessment of the 2014-2020 rural development programmes under the CAP[280] showed that most programmes are largely consistent with WFD information on the status of water bodies and identification of key pressures such as nutrient pollution, pesticide pollution, and hydrological alterations associated with abstraction for irrigation. However, some inconsistencies remain in relation to other pressures such as dredging, irrigation and other physical modifications of water bodies. The assessment also identified some measures under the programmes which, if not properly designed, could contribute to maintaining and/or increasing agricultural pressures, in particular the expansion of irrigation, new land drainage and new embankments, even if legal requirements exist to avoid these adverse effects (e.g. WFD requirements on non-deterioration[281] and Article 46 of the Rural Development Regulation[282]). One particular example in this context is water abstraction. While investments in irrigation funded by the EAFRD must comply with its Article 46, which includes conditions related to water savings (when improvements of existing irrigation installations are supported), it does allow, under certain conditions[283] for investments leading to an extension of irrigated areas where water bodies are in less than good status, which has been observed in many cases.

In terms of promoting best practices and fostering the transfer of knowledge on sustainable management of water in agriculture, the European Innovation Partnership for Agricultural Productivity and Sustainability and the European Network for Rural Development, both funded through the CAP, carry out important activities[284].

Finally, on implementation, the integrated assessment of the second RBMPs[285] shows that there is often a lack of cooperation between agricultural and water authorities and that the integration of agricultural and water policy processes at Member State level has been unsuccessful in many instances.

In relation to the Floods Directive, there is no explicit reference to agriculture in the Directive. However, looking at the EAFRD, the planned EU financing over the period 2014-2020 for "Climate Change Adaptation & Risk Prevention" is roughly €21 billion[286], and such measures could also be beneficial for flood risk management if properly designed.

Agricultural practices can have a significant impact on flooding events, due in particular to the potential for rapid run-off of water from compacted cultivated land, in combination with the rapid delivery of drainage water from agricultural land that has been artificially drained into water bodies at risk of flooding. There is therefore scope for better integration between flood risk management and farm management.

[280] WRc (2016).
[281] Requirements of the WFD to prevent deterioration and not to compromise the achievement of good status/potential, with a possible exemption under specific conditions as outlined in Article 4(7).
[282] Regulation (EU) No 1305/2013, Article 46 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) sets the conditions on accessing the Fund to support investments in irrigation. In particular, when existing installations are improved they must offer potential water savings of a minimum of between 5% and 25% in general, and for water bodies whose status has been identified as less than good for reasons related to water quantity, an actual reduction in water use of at least 50% of the potential water savings made possible by the investment..
[283] See Article 46(6) EAFRD
[284] https://ec.europa.eu/eip/agriculture/en/node/3699/related and https://enrd.ec.europa.eu/enrd-thematic-work/greening-rural-economy/water-and-soil-management_en
[285] Wood (2019).
[286] https://cohesiondata.ec.europa.eu/themes/5#

A study has been launched by the Commission's Directorate-General for Agriculture and Rural Development in parallel to this fitness check to evaluate in more detail the interaction between the CAP and EU water policy. The study will provide a complementary analysis to the fitness check.

Also on agriculture, 227 respondents (out of 493) in the public consultation cited the conversion of farmland to urban or industrial use as an unintended negative effect of the Directives. EU citizens were the largest group making this claim, followed by industries and competent authorities.

Further information is included in Annex 5.

Energy — hydropower

The Renewable Energy Directive (REDII) establishes a binding renewable energy target for the EU for 2030 of at least 32% of energy to be generated from renewable sources[287]. To date, there are more than 21,000 hydropower plants in Europe[288], which generate about 36%[289] of renewable electricity in the EU. Hydropower is an important driver for hydromorphological pressures; such pressures affect 40% of water bodies.

There are some potential trade-offs between the use of water to generate energy and the protection of natural flows and hydromorphology. The RED mentions that environmental requirements should be taken into account in the planning of new renewable energy installations, and the WFD allows for the possibility of exemptions (under certain conditions) to the objectives for the construction of new hydropower plants[290]. Technical support has been provided to Member States in the form of several common implementation strategy meetings, reports and guidance documents. Proper implementation of WFD Article 4(3) and (7) contributes to decreasing the impacts of hydropower on water and to ensuring a level playing field for the hydropower sector[291]. Approaches used by Member States to reconcile these competing water uses include the review of permits, the identification of priority rivers for which river continuity is to be restored, and the development of assessment tools[292].

The feedback from stakeholders is split between energy and hydropower experts and NGOs. The hydropower industry claims that the WFD obligations have led to uncertainty in the granting of new permits for hydropower and the operation of existing plants, while also pointing out that the requirements of Article 4(7) can make it a challenge to meet the EU's renewable energy targets. Conversely, NGOs highlight that hydropower has an environmental impact that should not be underestimated, and that it should be ensured that existing and new hydropower does not undermine the objectives of the WFD. However, it is difficult in practice to quantify the potential 'loss' of renewable energy production due to environmental protection measures. A 2011 study estimated the potential loss of production due to

[287] Directive 2018/2001/EU.
[288] WWF (2019); According to the study there are 21,387 hydropower plants in Europe with another 8,785 under construction. 33% of all planned hydropower in the EU is in protected areas. 91% of the plants recorded by the study are small plants that produce less than 10MW.
[289] Eurostat (2017).
[290] Article 4(7) or for setting specific objectives for existing plants Article 4(3).
[291] CIS Guidance Document No 4 (2004) and Guidance No 36 (2017)
STC Nestra (2018).
[292] Trinomics and Wood (2019).

mitigation measures to be around 2-3% of total production[293]. It is also not clear how many hydropower plants have not been built due to the WFD.

Significant progress has been made to integrate the objectives of renewable energy and water policies, in particular through environmental impact assessments[294] and justified applications of exemptions under Article 4(7) of the WFD, but there is still room for improvement. Renewable energy action plans and RBMPs are key instruments to guarantee coherence between the policies. However, further efforts are needed to ensure that the WFD requirements are integrated from the early stages of the planning process for existing and new hydropower plants. This in turn should contribute to increased certainty for investors and help meet European energy and climate targets, while minimising the impact of hydropower on the environment.

CIS Guidance Document No 36 provides support for the implementation of Article 4(7), and support is provided to help Member States better integrate the WFD requirement in the planning of new projects. For example, the Commission has organised several workshops and training sessions in Member States, and the European Investment Bank has developed a 'checklist tool' to support Member States in implementing Article 4(7). This guidance document is equally relevant for the transport sector (see below).

Transport — inland navigation

In the public consultation, transport was among the sectors with the largest number of replies pointing to incoherence between the transport sector and water legislation (124 replies out of 251). Of those who took this view, the most negative groups were citizens (31%) and NGOs (28%).

The Trans-European Transport Network (TEN-T) is an EU policy directed towards the development of a Europe-wide network of roads, railway lines, inland waterways, maritime shipping routes, ports, airports and rail–road terminals. It includes a number of priorities for inland waterway infrastructure development, to increase connectivity and guarantee 'good navigation status'. These navigation projects should comply with all environmental legislation and go through an environmental assessment.

The requirements associated with good navigation status, which often imply changes in the morphology and hydrology of rivers, can conflict with the objectives of the WFD. This issue has been raised in the consultation. Commission guidelines on good navigation status include recommendations to limit the impact of works on WFD status and to find the right balance between environmental objectives and navigation[295].

The Commission's 2019 implementation report found that navigation is among the main sectors responsible for hydromorphological alterations and for which exemptions under Article 4(7) are applied. The report also showed that progress has been made on integration between those two policies, but, as with hydropower, there remains room for improvement. One particular issue is the lack of proper methodologies for environmental assessment, while another is the failure to integrate environmental requirements at the early stages of project planning, often leading to delays and uncertainties in permitting procedures.

[293] Arcadis (2011).
[294] See also above in the section on strategic environmental assessment and environmental impact assessment.
[295] European Commission (2018). Guidelines towards achieving a Good Navigation Status.

Representatives from the navigation sector have stated that the WFD has caused delays and uncertainty in procedures and projects. As stated in the 2019 report from the Connecting Europe Facility Rhine Danube Corridor support report[296], a more integrated approach should help increase local and national acceptance of the projects, and consequently address this problem.

An evaluation of the 2013 Regulation TEN-T Guidelines[297] has been launched, with the aim of contributing to the preparation of the new guidelines for the next programming period.

Further information is included in Annex 5.

Fishing and aquaculture

Fishing and aquaculture activities require good water quality. At the same time, they exert pressures on some water bodies, for example due to the use of anti-parasitic substances. Implementation of the WFD is therefore important to these activities on both of these issues.

One concrete example of interaction between the WFD and fisheries policy concerns the preservation of the European eel population. The decline in the eel stock has numerous causes, including human activities such as fishing, hydropower turbines and pumps, pollution, habitat modification and the creation of obstacles to eel migration. This is why in 2007 the EU adopted the Eel Regulation[298]. The WFD contributes to the protection and preservation of the EU eel stock through its requirement to ensure continuity along rivers. Nonetheless, insufficient links have been made between RBMPs and the eel management plans established by EU Member States under the Eel Regulation and there is a lack of coordination among the competent authorities[299]. The Eel Regulation is currently being evaluated, including its coherence with the WFD.

The Directive on the quality of shellfish waters[300] was repealed by the WFD in 2013, but Member States were required under WFD rules to maintain at least the same level of protection against pollution of shellfish waters through their new status as protected areas. However, the Commission's implementation report on the second RBMPs found that implementation of this obligation has been uneven. While about half of the Member States have maintained the same requirements, the others have set different standards or no specific standards at all[301]. In the public consultation and interviews, the aquaculture sector expressed concern that the level of protection for production areas under the WFD is insufficient.

In 2013, the Commission issued a communication on strategic guidelines for the sustainable development of EU aquaculture[302], with the aim of helping Member States and stakeholders overcome the challenges facing the sector. In 2016, it adopted a guidance document[303] on the application of the WFD and the MSFD in relation to aquaculture. This includes good practices on benthic impacts and nutrients, disease and parasites, chemical discharges from aquaculture, escapees and alien species, and physical impacts, disturbance and predator

[296] INEA (2018).
[297] Regulation (EU) No 1315/2013.
[298] Regulation (EC) No 1100 /2007.
[299] Hanel, R (2019).
[300] Directive 2006/113/EC.
[301] Trinomics and Wood (2019).
[302] European Commission (2013) — COM(2013) 229 final.
[303] European Commission (2016) SWD(2016) 178 final.

control. The revision of the 2013 Strategic Guidelines is ongoing and adoption is expected in 2020.

Further information is included in Annex 5.

Non-energy extractive industries

The relevance of pressures from extractive activities depends on the materials being extracted, the characteristics of the hosting rock and the chemicals that may be used in the industrial processes. Mining activities have been reported in the second-cycle RBMPs as exerting significant pressures on the chemical quality of water resources, particularly due to the discharge of heavy metals[304]. Important progress has been made towards sustainable extraction of raw materials through Environmental Impact Assessments, but there is still room for improvement, in particular concerning pollution from historic mining activities[305]. To reduce the environmental impacts of mining activities, the Directive on the management of waste from extractive industries[306] requires industry to provide measures, procedures and guidance to prevent or reduce the adverse effects of the management of waste from extractive activities.

In their response to the public consultation, representatives from the mining industry pointed to the possible trade-offs between the objectives of the WFD and the 2008 Raw Materials Initiative[307], which aims to secure the supply of raw materials. The concerns of the industry relate to the difficulties they encounter in obtaining a permit to (re-)open a mine in cases where the additional emissions would lead to the deterioration of chemical status. This cannot be granted because no exemptions are applicable in such cases under the WFD. They also point out that mines are often located in areas where some elements occur at higher concentrations due to natural conditions.

Further information is included in Annex 5.

EU funding

European Commission funding instruments such as the LIFE programme, the European Structural and Investment Funds, Horizon 2020 and the common agricultural policy have facilitated the implementation of the WFD and FD's objectives.

European Structural and Investment Funds

In the 2014-2020 period, the European Structural and Investment Funds (ESIFs) include the Cohesion Fund, the European Agricultural Fund for Rural Development, the European Regional Development Fund, the European Social Fund and the European Maritime and Fisheries Fund. The water sector has been a key focus of cohesion policy environmental investments: it received most of the ESIF funding dedicated to the environment and accounted for just over half of all direct environmental allocations in 2000-2006 and 2007-2013, falling to just over 40% for 2014-2020. In the new Member States especially, support

[304] Significant pressure from diffuse pollution from mining has been reported for 7% of groundwater body areas and for less than 1% of surface water bodies. Point source pollution from mining has been reported for 3% of groundwater body areas and for less than 1% of surface waters. Significant pressure from mining waste disposal has been reported for 4% of water bodies.

[305] Vidal-Legaz, et al (2018).

[306] Directive 2006/21/EC.

[307] European Commission (2008) — COM(2008) 699.

to investments in waste water treatment (€10.8 billion from the European Regional Development Fund and the Cohesion Fund) has significantly contributed to the improvement of water quality. In the 2014-2020 programming period, €3.0 billion was allocated to measures of direct relevance to the WFD, such as water metering, water reuse, monitoring and studies. Almost €8 billion is allocated to climate change adaptation and risk prevention, the bulk of which is being invested in flood prevention and flood risk management[308].

Coherence between the ESIFs and the WFD's objectives was ensured through '*ex ante* conditionalities', which required Member States to fulfil certain conditions in order to receive funding. The *ex ante* conditionalities were designed to increase the effectiveness of the funds, and have contributed to the timely adoption of river basin management plans and to changes in water-pricing policies. They have also improved coordination between national and regional authorities in the Member States. One reason for this was that the *ex ante* conditionalities raised awareness of water policy requirements in other ministries[309].

LIFE(+)

Water sector projects are also an important part of the LIFE programme. From 2000 to the 2012, LIFE co-financed 421 projects with an estimated budget of €1.1 billion[310]. Most LIFE projects in the field of water address aspects relevant to WFD objectives. These aspects include waste water treatment technology, lowering the impact of hydropower and river renaturing.

Horizon 2020

Significant funding has been allocated for water under Horizon 2020 (2014-2020). This was particularly the case during 2014-2015, when water was a focus area. This funding is spread across different parts of Horizon 2020, but a significant part of it was allocated under Societal Challenge 5 'Climate action, environment, resource efficiency and raw materials' which contributes to the objectives of EU water policy (mainly the WFD and FD). EU funding allocated to water-related projects during 2014-2017 under Societal Challenge 5 was around €375 million (66 projects). Most of the water projects are inter-disciplinary and many address the cross-sectoral aspects of water resource protection and management.

5.3.3: 'To what extent is the legislation coherent with international obligations?'

Overall response:

The Water Framework Directive, its daughter directives and the Floods Directive are fully coherent with the EU's international obligations related to water, such as the 2030 Agenda for Sustainable Development, the UNECE Water Convention, the Regional Sea Conventions and the Sendai Framework for Disaster Risk Reduction. Meeting the Directives' objectives contributes to meeting the commitments under these international obligations.

2030 Agenda for Sustainable Development

The EU is a signatory to the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs). The Directives subject to this fitness check are fully coherent with the SDGs. Sustainable Development Goal 6 (SDG 6) 'Clean water and

[308] WRc (2017).
[309] European Commission — SWD(2017) 127.
[310] European Commission (2012) — COM(2012) 673.

sanitation', for example, includes six targets that cover issues such as improving water quality by reducing pollution, implementing integrated water management and restoring water-related ecosystems[311]. Along with other pieces of EU water legislation, the Water Framework Directive and its daughter directives are a tool that contributes significantly towards fulfilling several targets under SDG 6 at EU level.

The Floods Directive also contributes to several SDGs, including SDG 11 on Sustainable Cities and Communities and SDG 13 on Climate Action.

UNECE's Water Convention

The integrated approaches taken by the WFD and its daughter directives are fully coherent with the EU's commitment to UNECE's[312] Water Convention[313], which aims to promote the protection and management of transboundary surface waters and groundwaters in the European region and beyond. Several of the commissions in charge of international RBDs are also signed up as joint bodies under the Water Convention.

Regional seas conventions

The EU is also a contracting party in several intergovernmental organisations set up to protect the marine environment, such as the Baltic Marine Environment Protection Commission or 'Helsinki Commission' (HELCOM[314]), the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR[315]) and the Barcelona Convention[316,317,]. Measures undertaken to implement the WFD contribute to the objectives of the conventions. In the HELCOM Baltic Sea Action Plan, for example, a nutrient reduction scheme was introduced in 2007, which includes reduction targets per country compared to a reference period (1997-2003). WFD implementation and the development of programmes of measures at Member State level are then coordinated with the Marine Strategy Framework Directive, in line with the Baltic Sea action plan[318]. Some issues have been raised regarding the lack of consistency between the indicators and thresholds set by Member States for the assessment of status required for the regional sea conventions, the MSFD and the WFD (see above).

Sendai Framework for Disaster Risk Reduction

The Sendai Framework for Disaster Risk Reduction[319] is a global agreement to reduce and prevent disaster risks across the globe. It aims to strengthen social and economic resilience to ease the negative effects of climate change and man-made hazards. In 2016, the Commission

[311] https://www.un.org/sustainabledevelopment/water-and-sanitation/.
[312] United Nations Economic Commission for Europe.
[313] Convention on the Protection and Use of Transboundary Watercourses and International Lakes — http://www.unece.org/env/water.html.
[314] http://www.helcom.fi/
[315] https://www.ospar.org/
[316] https://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/barcelona-convention/index_en.htm.
[317] The Commission is also an observer in the Bucharest Convention, see https://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/bucharest/index_en.htm.
[318] Trinomics and Wood (2019).
[319] The Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) is the first major agreement of the post-2015 UN Sustainable Development agenda. https://www.unisdr.org/we/coordinate/sendai-framework

launched an action plan on the implementation of the Sendai Framework[320]. The Floods Directive is referred to several times in the plan, which will support action in the EU Member States towards four Sendai priorities: understanding risks, strengthening governance, investing in risk reduction and increasing preparedness for response.

Paris Climate Agreement

One of the key instruments to meet the goals set in the Paris Climate Agreement will be sustainable water management. Water holds great potential for adaptation to a changing climate and mitigation of greenhouse gas emissions, as also illustrated in the priorities outlined in Member States' national climate change adaptation strategies. The WFD and the FD have both allowed Member States to account for impacts (or expected impacts) of climate change on the management of water quality and quantity.

Ramsar Convention

The objectives and tools of the WFD and the FD enable Member States to meet their commitments under the Ramsar Convention on Wetlands of International Importance[321]. While the EU is not a contracting party, many Member States are. In 1995, the Commission reported that between 1900 and the 1980s Europe had lost two thirds of its wetlands, and that the remaining ones were under significant pressures such as nutrients, land use change, abstraction or hydromorphological changes[322]. Wetlands are also key to the EU's biodiversity objectives. Many species in EU wetlands are still reported to be under severe threat[323]. As wetlands offer huge potential as carbon sinks, their protection or restoration through WFD and FD implementation would be an important climate mitigation action.

5.4. Relevance

The assessment of the Directives' relevance considers whether their intervention logic still addresses societal needs and whether they are fit for purpose to address emerging challenges (Section 5.4.1). It also looks at how relevant the Directives are to citizens (Section 5.4.2) and to the EU's external policy objectives (Section 5.4.3).

5.4.1: 'To what extent are the objectives still relevant and properly addressing the key problems and concerns related to water that ecosystems and the society presently face?

Overall response:

Water is an essential societal need. The objectives of the Directives to ensure water protection and non-deterioration of water quality and to address the adverse consequences of floods are still very relevant today and even increasingly so. They enable authorities to address the key issues related to water both in terms of quality and quantity.

The Directives are sufficiently flexible to address emerging societal challenges such as water scarcity, climate change, and pollutants of emerging concern such as (micro)plastics or pharmaceuticals (some of which are already listed in the surface-water watch list). However, climate change or micro-plastics are not explicitly mentioned in the WFD and daughter directives.

The process of keeping up with science has proven to be slow and more difficult than expected, in

[320] European Commission (2016) — SWD(2016)205.
[321] https://www.ramsar.org/
[322] European Commission (1995) — COM(1995)189.
[323] Ramsar Convention on Wetlands (2018).

particular for the EQSD (in terms of listing relevant new priority substances). In addition, while taking account of some groups of substances, the EQSD does not generally address mixtures of substances. The knowledge and modelling of the impact of climate change on all sources of floods should also be improved.

Water is a key environmental challenge, now and in the future

Water and aquatic ecosystems

Water is an essential societal need. The objectives of the directives covered by this fitness check are as relevant now as they were when the Directives were adopted, if not more. The objectives of the directives subject to this fitness check contribute towards improving the situation with regard to six of the nine planetary boundaries (freshwater use, nitrogen and phosphorus cycles, ocean acidification, chemical pollution, biodiversity and climate change, see Figure 22).

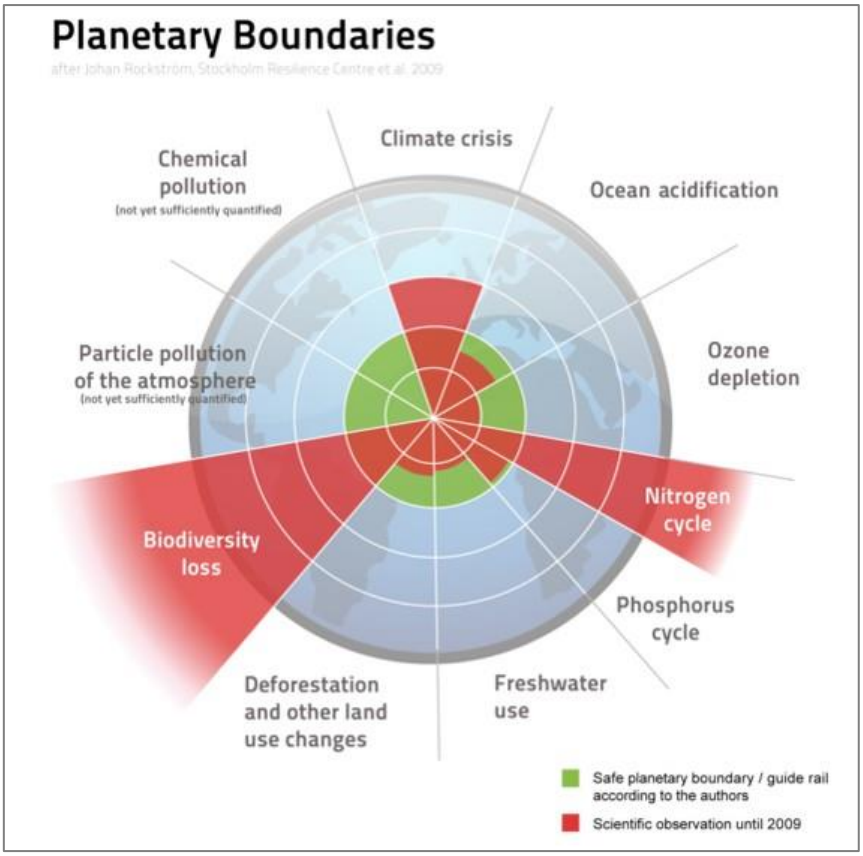


Figure 22: Planetary boundaries (Source: Rockstrom et al., 2009[324])

The relevance of the Directive's objectives is confirmed in the EEA's report on the State of European Waters, which points to the significant pressures on the aquatic environment in Europe (see also Section 3.1). Other landmark reports have come to similar conclusions. The World Economic Forum's Global Risks Report of 2019 for example lists extreme weather events and water crises as the third and fourth most important risks[325]. The OECD's

[324] Rockstrom et al (2009).
[325] World Economic Forum (2019).

Environmental Outlook until 2050[326] list pollution and increasing water use as key challenges for the future. More recently, a report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) on a global assessment of biodiversity and ecosystem services found that biodiversity, including in aquatic ecosystems, is under serious threat in Europe[327].

The continued relevance of the WFD and its daughter directives was confirmed by Water Directors of the EU and the European Economic Area countries, who repeatedly confirmed the need to maintain the current level of ambition of the WFD (see, for example, the conclusions of the Vienna meeting of Water Directors[328]).

Floods

The continued relevance of floods management is also undisputed. According to the EIB, floods are the largest source of GDP losses from natural disasters in Europe (€150 billion in 2002-2013[329]). Reported disaster losses, however, only reflect structural damages to tangible assets, neglecting damage to health, the integrity of ecosystems and intangible cultural heritage value. Therefore these economic figures should be seen as a lower-bound estimate[330]. Estimates indicate that coastal and inland floods killed more than 2,000 people and affected 8.7 million people in Europe[331] between 2000 and 2014[332].

A report from the Intergovernmental Panel on Climate Change (IPCC) on the impacts of global warming of 1.5 °C estimated a doubling in the population affected by fluvial floods[333]. Figure 23 shows the increasing occurrence of floods in Europe.

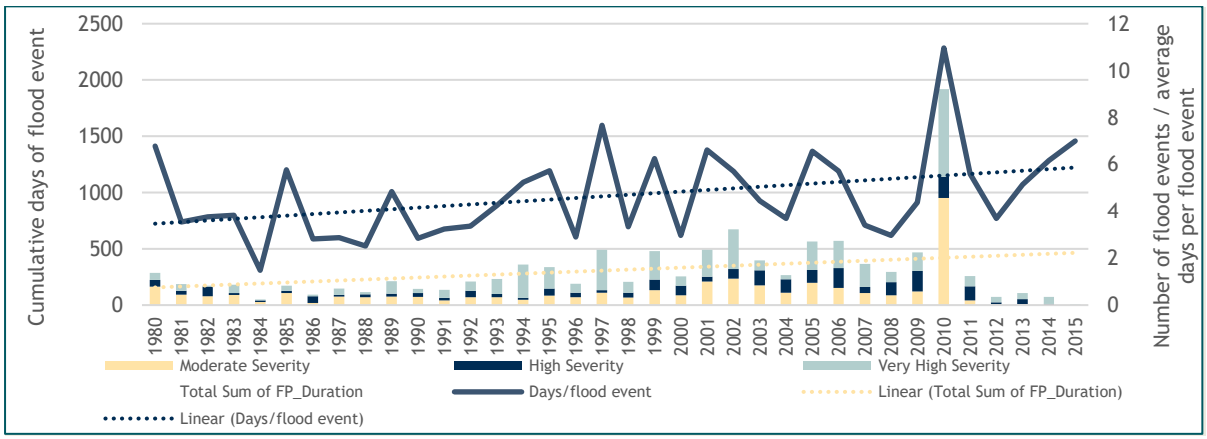


Figure 23 Evolution of number and length of flood events and their severity, 1980-2015 (Source: EEA-ETC-ICM Flood Phenomena dataset, 2015)

[326] OECD (2012).
[327] IPBES (2018).
[328] https://circabc.europa.eu/ui/group/9ab5926d-bed4-4322-9aa7-9964bbe8312d/library/e4abb053-ea21-4962-8671-425624cd872e/details
[329] EIB (2016).
[330] EEA report 14/2017.
[331] European Environment Agency (EEA) member countries.
[332] Data from the World Health Organization (WHO) European Region, based on a combination of data from the Emergency Events Database (EM-DAT) and the Dartmouth Flood Observatory (DFO), quoted by EEA https://www.eea.europa.eu/data-and-maps/indicators/floods-and-health-1/assessment
[333] https://www.ipcc.ch/sr15/ extract from a table in Chapter 3, page 247.

Are the Directives fit for purpose to address emerging challenges?

To establish whether the Directives are fit for purpose, it is also necessary to assess whether they cover all societal needs related to water, including emerging challenges such as water scarcity, climate change, mixtures of chemicals, and pollutants of emerging concern.

Water scarcity

Figure 24 shows that water scarcity, while having some seasonal variability, is a concern that is not limited to the south of Europe, affecting regions in different parts of the EU.

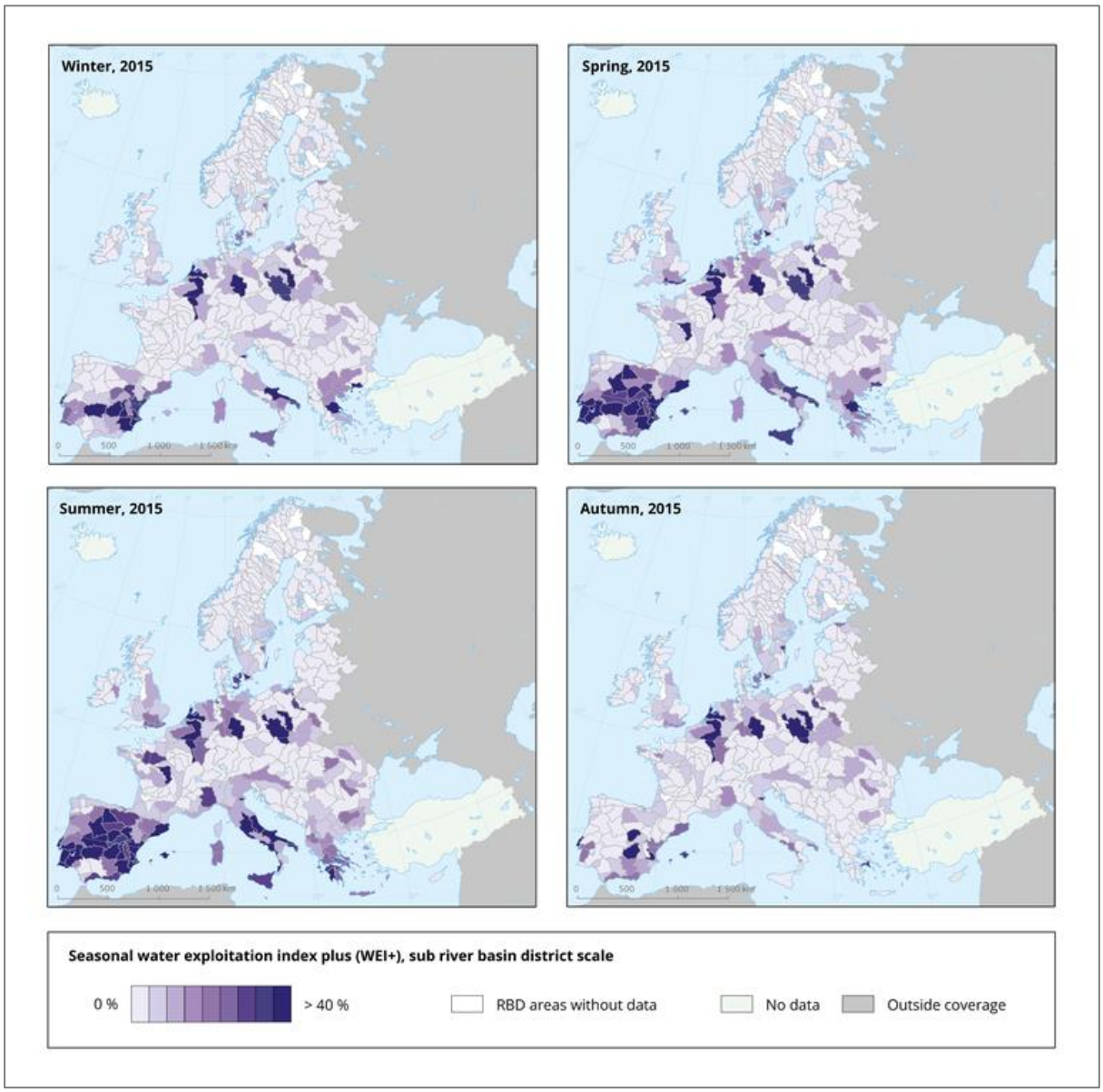


Figure 24: Seasonal water exploitation index plus (WEI+), sub river basin district scale, 2015 (Source: EEA)

The results of the public consultation, in particular from the workshops, focus groups and interviews, show that many stakeholders are concerned that the WFD does not pay enough attention to water quantity[334].

While it is true that the Directive does not include any explicit requirements on water quantity[335], it does address water quantity in several ways. Water quantity is, for example, implicitly included in the definition of good ecological status and explicitly in hydromorphological elements (i.e. flow regime). Furthermore, good quantitative status is required for groundwater, where Member States must ensure a balance between abstraction and recharge rates. The requirement of water pricing also aims to provide incentives for water users to use water resources efficiently.

Nonetheless, the Commission's latest implementation report noted that there are still some issues that raise concern, e.g. exemptions from controls and permits for small abstractions, even when this leads to groundwater bodies not achieving good quantitative status. This is a problem given that 16% of the area of groundwater is affected by over-abstraction in Europe.

To contribute to the alleviation of water scarcity, the Commission adopted a draft regulation of the European Parliament and the Council on minimum standards for water reuse in May 2018[336]. In the context of integrated water management, this instrument aims to stimulate the uptake of water reuse by offering a sustainable, alternative water supply for agricultural irrigation.

Climate change

Climate change has accelerated and its effects are being felt on a wider and larger scale. The less prominent place given to the issue of water quantity in the WFD does not seem to subtract significantly from the legislation's potential to address the impacts of climate change on water management. Even though the WFD and daughter directives do not explicitly require Member States to include climate change in the RBMPs, Annex II to the WFD refers to the need to identify all 'significant pressures' affecting water bodies (see Section 2.2 on Article 5 WFD/pressures and impacts analysis). This identification of pressures, together with the cyclical nature of the implementation, provides the framework for Member States to incorporate the expected impacts of climate change (both on quantity and quality) and the updated scientific and technical knowledge into their planning process. For groundwater for example, the inclusion of a water balance (availability of groundwater resource vs abstraction rate) in the classification of quantitative status contributes to a better response to new or

[334] Some stakeholders have related this to the fact that the Treaty on European Union provides for unanimity voting for water quantity issues in its Article 192(2)(b).

[335] The sufficient supply of water is indirectly referred to in Article 1 'The purpose of this Directive is to […] promote sustainable water use based on a long-term protection of available water resources […] and thereby contributing to […] the provision of the sufficient supply of good quality surface water and groundwater as needed for sustainable, balanced, and equitable water use'. Quantitative aspects are also included in recital 19 'This Directive aims at maintaining and improving the aquatic environment in the Community. This purpose is primarily concerned with the quality of the waters concerned. Control of quantity is an ancillary element in securing good water quality and therefore measures on quantity, serving the objective of ensuring good quality, should also be established.' Recital 34 also refers to quantitative aspects 'For the purposes of environmental protection there is a need for a greater integration of qualitative and quantitative aspects of both surface waters and groundwaters, taking into account the natural flow conditions of water within the hydrological cycle'. Measures related to ecological flows (Art. 11.c, e, f, i,) are also quantity-related.

[336] https://ec.europa.eu/environment/water/pdf/water_reuse_regulation.pdf

growing climate change-related pressures, provided that climate change scenarios are adequately considered when identifying pressures and the necessary measures.

The document prepared by the 'Consultation Group' of Water Directors[337] highlights the importance of dealing with the impact of climate change and with pollutants of emerging concern. However, it does not elaborate on how the WFD and daughter directives currently allow, or hamper, the management of such issues.

Unlike the WFD, the FD does have an explicit requirement for Member States to take the impacts of climate change on the occurrence of floods into account. This requirement applies from the second PFRAs and FRMPs onwards (Article 14). The increasing relevance of this need is reflected by the fact that no less than 24 Member States provided evidence of having started to take account of climate change impacts already from the first cycle. Out of those, 14 made links between their FRMPs and their national climate change adaptation strategies. More than half of the Member States have included measures to raise awareness on insurance schemes in their FRMPs, even though insurance is not explicitly mentioned in the FD[338].

Keeping up with science

Regarding the EQSD, the process of keeping up with science (i.e. listing relevant new priority substances) has proven to be slow and more difficult than expected. The prioritisation exercise and the determination of the EQSs themselves take time. Not all necessary hazard or monitoring data are necessarily available to enable a risk assessment to be completed. This is particularly true for some pollutants of emerging concern. In some cases, sufficiently sensitive analytical methods do not exist. Moreover, the legislative process itself, by ordinary legislative procedure, is burdensome. Although the prioritisation processes have already drawn on risk assessments available from the EU agencies dealing with the authorisation of chemicals, all opportunities for strengthening those agencies' involvement should be explored. Another area where improvement is needed is the connection between monitoring and modelling for the development of emission inventories, which are necessary to measure progress in the reduction of pollution. An EU-scale analysis[339] highlights that inventories, particularly of diffuse sources, can indeed be produced, although in various Member States they are generally not available or publicly accessible.

Following up the report of the European Court of Auditors on the Floods Directive, the Council recently issued conclusions[340] emphasising the need to improve the knowledge and modelling of the impact of climate change on all sources of floods. The Council called upon the Commission to work together with the Member States to reinforce and/or develop appropriate tools that better analyse and forecast these impacts. Currently, the Commission is considering how to best respond to the Council's call to support Member States, for example within the common implementation strategy framework.

[337] A group of water directors who contributed to this Fitness Check — see Section 4.1

[338] In a 2018 report on the FD, the European Court of Auditors recommended that Member States plan action to raise public awareness of the benefits of insurance coverage against flood risks and increase coverage. The Commission in turn recommended in its latest implementation report that Member States assess whether encouraging economic instruments promoting flood risk reduction (possibly including insurance) would be relevant to their particular situation and mix of measures.

[339] Pistocchi et al (2019).

[340] European Council (2019) Conclusions 7115/19.

Mixtures of chemicals

Whereas the EQSD and the GWD mainly take a single substance approach, in the real world there are no cases where only a single substance occurs in the environment. Emissions data and research show that the aquatic environment wildlife and humans are exposed to mixtures of chemicals, including many more substances than just priority substances[341]. These pollutants originate from urban, industrial and agricultural activities, from point and diffuse sources, and include pollutants from storm waters, transport and atmospheric deposition.

One scientific study of three European rivers detected 426 organic chemicals, including 173 pesticides, 128 pharmaceuticals, 69 industrial chemicals and 56 other compounds[342]. These include the neonicotinoid insecticides imidacloprid, thiacloprid and acetamiprid, as well as antibiotic drugs such as azithromycin, erythromycin and clarithromycin, and herbicides, e.g. diuron and isoproturon. These chemicals can have an effect on the nervous system, disrupt photosynthesis in plants or interact with the hormone system of humans and animals. The challenge is to figure out if combined adverse effects result from this and which of the many substances present are the most important for the toxicity of a mixture.

Furthermore, the focus on individual substances, together with the slow process for updating the Annex to the EQSD, make it possible that the excessive concentrations of some substances may be addressed through their replacement with other substances that are not yet listed in the Directive, but which may have similar or even worse effects on health and the environment. A long time may pass before the problems caused by a new substance are identified and the substance is added to the list of priority substances or even included by Member States as an RBSP.

Under the common implementation strategy, extensive work has been undertaken on the possibility of using effect-based methods to determine the risk from chemical pollutants. This work is continuing.

Pollutants of emerging concern

The Water Framework Directive has been found to be sufficiently prescriptive regarding the pressures to be addressed, yet flexible enough to accommodate emerging challenges. The inclusion of new substances in the annexes to the EQSD or the GWD, when justified by new knowledge, is provided for in the Directives. The GWD also requires Member States to identify and consider all pollutants putting groundwater bodies at risk, and data are being gathered for emerging pollutants through the voluntary watch list mechanism. For surface waters there is the surface-water watch list. In addition, pollutants of emerging concern should be identified by Member States as RBSPs. These pollutants should therefore be adequately managed even if the pollutants in question are not listed in the priority substances list.

The presence of macro- or micro-plastics is increasingly highlighted as a problem for Europe's water. Micro-plastics are ubiquitous in the environment, including in all of Europe's marine and freshwaters. The WHO is calling for: (i) further assessment of micro-plastics in the environment and their potential impacts on human health; and (ii) a reduction in plastic pollution to benefit the environment and reduce human exposure. The reporting of the second RBMPs showed that although the presence of (micro)plastics in water in the EU is a known

[341] EEA report 18/2018.
[342] Busch et al (2017).

problem, litter was only identified as a significant pressure for a very small number of surface water bodies in only a few Member States.

Responding to the EQSD requirement to develop a holistic concept to address the emerging issue of pharmaceuticals, the Commission adopted a Communication on an EU Strategic Approach to Pharmaceuticals in the Environment in March 2019[343]. As also signalled in the evaluation of the UWWTD, the presence of pharmaceuticals in water and soil is increasing across Europe. A small proportion of these (including some anti-depressants, contraceptive substances, cytostatica, x-ray contrast media, antibiotics and antiparasitics) have effects on wildlife (fish, birds, insects and consequential effects on the wider ecosystem), and may pose risks to human health. Even the most advanced waste water treatment technologies currently in place cannot remove all pharmaceuticals from water, and upgrading treatment for this purpose alone may in any case be disproportionally expensive and resource-intensive. The WFD can offer part of the response to this problem by focusing action on the problematic substances, on particular pathways (e.g. livestock farming) and on water bodies more likely to receive such substances.

A workshop[344] on pollutants of emerging concern organised in the context of the consultation concluded on the importance of prevention at source. While waste water treatment plants are pathways for some of these substances, they are not the origin of the pollution. There is no single treatment technique that can address all pollutants of emerging concern. In addition, tackling substances individually is not an effective approach, and broad treatment approaches are better suited, also in taking into account mixtures.

5.4.2: 'How relevant are the Directives to EU citizens?'

Overall response:

The Directives are very relevant to citizens directly in their daily lives, for their health and livelihoods. This is confirmed by the large number of replies from citizens to the public consultation, and is demonstrated by the strong dependence of the economy on the availability of water.

The Directives' legal provisions allow for the public's main concerns in relation to water management to be addressed, both in terms of quality and availability.

Water is an important environmental issue for EU citizens

Water is important to European citizens. The public consultation for this fitness check received more than 370,000 responses in total, an exceptionally high number. The vast majority of the responses (those of more than 368,000 citizens) were identified as being part of campaigns promoted by several environmental organisations[345]. The respondents stated that they think the WFD is fit for purpose and that they are opposed to changing it (see text box below).

[343] European Commission — SWD (2019) 128.
[344] See Annex 2 — Consultation activities — synopsis report.
[345] Trinomics and Wood (2019).

Final comment provided by more than 368,000 citizens who responded to the public consultation for this fitness check as part of the WWF #ProtectWater campaign

'I care about the current and future state of our freshwater ecosystems and I agree with the environmental groups that the EU Water Framework Directive (WFD) is fit for purpose, and it has delivered on protection and restoration of our waters, as well as yielded benefits for economy and society. Please consult my more detailed response on why the WFD is effective, efficient, relevant, coherent and of added value in the comment box of Part II of the survey.

As a citizen who cares about the environment, I am opposed to changing the WFD, and want to see its high standards upheld and met across Europe. Currently, Member States show little ambition in implementing the WFD. This is evident in ineffective river basin management plans, programmes of measures that are poorly delivered, insufficient funding allocated to implement control measures, and excessive use (and misuse) of various types of exemptions provided within the WFD. WFD needs full implementation by Member States, and enhanced enforcement from the European Commission.'

Other surveys and campaigns have also demonstrated the importance of water to EU citizens. In 2013, a large campaign called Right2Water gathered 1.8 million signatures across the EU to underline that many citizens consider guaranteed water and sanitation a principal human right[346]. More recently, a 2017 Eurobarometer study[347] showed that more than a third (36%) of EU citizens picked the pollution of rivers, lakes and groundwater as one of the four most important environmental issues in their lives[348]. Some 25% of EU citizens also listed frequent flood and drought events as one of the four main environmental issues[349,350].

A large majority of individual responses from citizens and stakeholders to the public consultation (1,279, representing 73% of total responses n=1,755[351]) found that flooding prevention and protection is of high or medium priority and believe that flood risk is a problem that needs to be tackled in their country or region. Less than half of respondents replied to all consultations that the risk of flooding is higher in their area than it was a decade ago[352].

The EU's economy is fully dependent on water in good quantity and quality

Water is also of great value in the EU economy: 80% of European companies state that the availability of sufficient good quality freshwater is important or vital to their operations[353]. The EU's water-dependent sectors generate €3.4 trillion or 26% of the EU's annual gross

[346] See https://www.right2water.eu/
[347] European Commission — Special Eurobarometer 468/2017.
[348] After climate change, air pollution and waste management.
[349] Respondents were asked to list the four most important environmental issues.
[350] Trinomics and Wood (2019).
[351] This response was equally high through all categories of stakeholders.
[352] There was no specific written reference in either the public or the targeted consultations to pluvial/flash floods, apart from one contribution from the insurance sector that proposed to extend the scope of the FD to include pluvial flooding. The FD does, however, include pluvial floods, owing to the wide definition of what a flood is (cf. Article 2(1): '"flood" means the temporary covering by water of land not normally covered by water.') There are no exclusions except potentially for floods from sewerage systems.
[353] CDP (2018); Based on a survey filled in by 183 companies. In terms of market capitalisation, the number of companies that use CDP represent 80% in Europe, and 55% globally.

value added and employ around 44 million people[354] (see Figure 25). Continued availability of good quality water, in sufficient quantity to serve all uses, is therefore imperative.

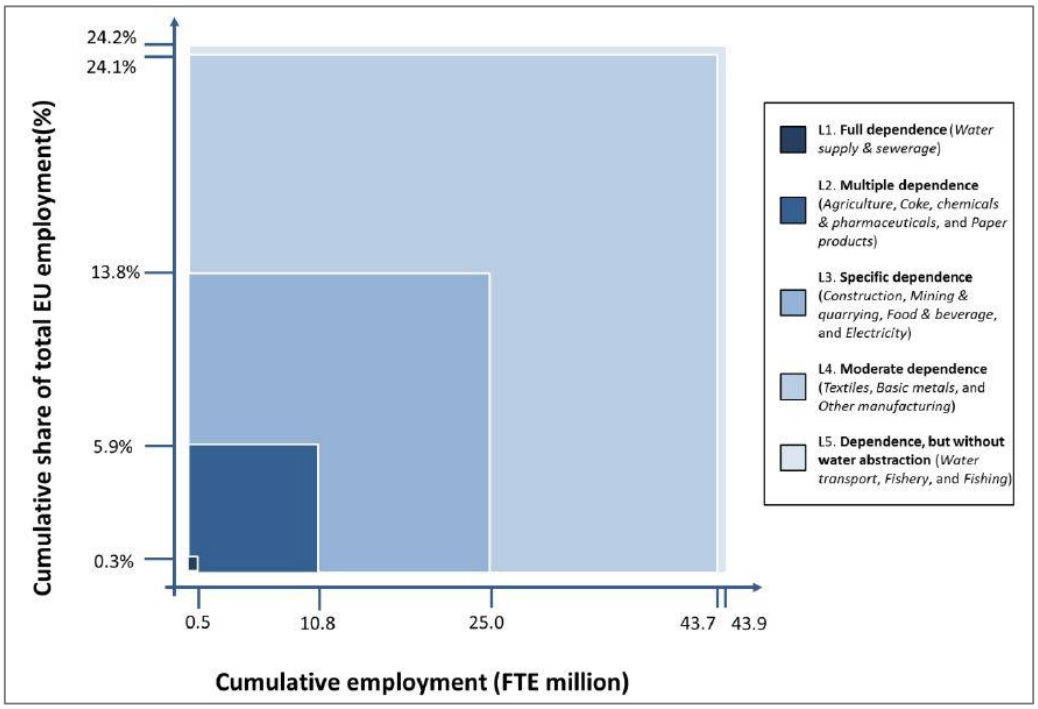


Figure 25: Employment generated by the EU's water-dependent sectors (million full-time equivalents and % of total EU), 2015[355]

5.4.3: 'How relevant are the Directives for EU external policy objectives (considering the development, cooperation and transboundary water dimensions)?'

Overall response:

The EU water legislation being evaluated is a key instrument used by the EU to respect its commitments at global level, in line with the Sustainable Development Goals. In particular, the need for transboundary cooperation in water management is enshrined in EU water legislation.

The objectives of the Directives have been the building block for international cooperation in important river basin conventions such as those for the Danube and the Rhine, and for bilateral river basin cooperation between EU Member States and non-EU Member States. They provide the basis for the building of appropriate water policies in candidate countries and allow for comprehensive cooperation with major international partners.

Candidate and pre-accession countries

The legislation forming the focus of this fitness check provides a key reference framework for cooperation with candidate countries, which are at varying stages of transposing the EU water *acquis* and implementing policies on that basis. The fact that the EU has now considerable experience with implementation is very useful when helping the candidate countries find the most effective path towards creating the same policy framework.

[354] Ecorys (2019).
[355] Ecorys (2019).

In addition, non-Member States, in particular the EFTA countries, have implemented the WFD and daughter directives, acknowledging their relevance for sustainable management of water resources. In the consultation, the Norwegian Environment Agency commented that since Norway's adoption of the WFD, agreements for transboundary cooperation were made based on the Directive's legal framework, which greatly supported cooperation. For example, in 2014, Sweden and Norway agreed on the details of river basin coordination[356].

The objectives of the WFD and FD have also been the building block for international cooperation in important river basin conventions such as for the Danube[357] and the Rhine[358], both of which include EU Member States and non-EU Member States.

Cooperation with international partners

Water in particular is an area where many countries around the world are keen to cooperate with the EU, often in a construct that involves several ministries, Member States and business representatives. EU's international partners, such as China and India, have demonstrated a keen interest in particular in the concepts of the WFD, especially the governance elements and the technological solutions applied to addressing water problems.

Bilateral cooperation on water has been further stepped up. Specific examples include: (i) the China Europe Water Platform[359] (since 2012) and a new EU-China Water Policy Dialogue established in 2017; (ii) the India-EU Water Partnership created in 2015; (iii) the 2018 cooperation roadmap with Iran, which, among other topics, covers water issues; and (iv) water cooperation agreed with Brazil in 2018 (and currently under development).

UN sustainable development and disaster risk reduction agendas

The EU's well-established *acquis* on water policy, including a holistic approach to water management (WFD) and flood risk management (FD) has served it well in the context of international cooperation on sustainable development and disaster risk reduction. For example, EU countries were able to unite around these issues during the negotiations on the 2030 Agenda for Sustainable Development (2015), the Sendai Framework for Disaster Risk Reduction and the Addis Ababa action agenda (the 'means of implementation' element of the 2030 Agenda for Sustainable Development). The Directives covered by this fitness check are the main tools for implementation in the EU Member States of Sustainable Development Goal No 6 on clean water and sanitation (see Section 5.3.3).

5.5. EU added value

The assessment of the Directives' EU added value considers what changes are due to intervention at EU level and what Member States would have done without EU action. This considers whether the Directives are in line with the subsidiarity principle, which requires that EU action only be taken when it is better achieved at EU level and not by Member States individually.

[356] Trinomics and Wood (2019).
[357] International Commission for the Protection of the Danube River (ICPDR).
[358] International Commission for the Protection of the Rhine.
[359] https://cewp.eu/

5.5.1: 'What is the additional value resulting from these Directives compared to what could have reasonably been expected from Member States acting at national, regional and/or international (including non-EU) level?'

Overall response:

60% of the EU's territory lies in river basins that cross at least one national border. There is clear EU added value in transboundary management of water and of flood risks, as actions by one Member State that affect the water of a lake or river shared with another Member State directly affect the status of that water body in both Member States. Similarly, flood risks for downstream regions are strongly affected by events and actions in upstream regions.

The Directives have triggered or reinforced action at European level to address the transboundary pressures on water resources and flood risk at river basin level, both nationally and internationally. Experts interviewed during the consultation highlighted the power of a long-term binding policy target and the fact that the Directives' level of ambition is higher than what could have been expected without them. At the same time, the Directives leave sufficient flexibility to Member States to adapt water management to local conditions, in line with the principle of subsidiarity. However, in some cases this has led to sub-optimal levels of implementation.

Natural interconnections between countries

The Directives' EU added value stems in the first place from the natural interconnections between Member States and even third countries. Globally, over 310 lake and river basins stretch across national borders[360]. Around 60% of international river basins lack any type of cooperative management framework. In the EU, 60% of the territory lies in river basins that cross at least one national border. Action by one Member State that affects the water of a lake or river shared with another Member State therefore directly affects the status of that water body in both Member States. In addition, hydrological cycles are so interconnected that land use in one country can even affect precipitation beyond its borders. This is even more relevant for floods: fluvial flood risks for downstream regions are strongly affected by events and actions in upstream regions. A harmonised approach in terms of water management principles and water quality parameters secures an EU-wide level playing field and contributes to the functioning of the internal market.

This natural interconnectivity is the basis for the Directives' requirements on the transboundary management of water and of flood risks. This transboundary management already existed in some cases, but was not a generalised approach to water management or to flood risk management, not only among different countries, but even among different regions in the same country. Even where it already existed, this transboundary approach was significantly strengthened after the Directives entered into force (e.g. through the development of common river basin management plans). At the same time, the Directives leave sufficient flexibility to the Member State to adapt water management to local conditions, in line with the principle of subsidiarity (see Sections 2.2 and 5.1.2).

Higher level of ambition

It could be argued that some European countries would not have national legislation on water management in the absence of the Water Framework Directive. This is an argument for

[360] IUCN 'Water cooperation: diplomacy from source to sea' - https://www.iucn.org/news/water/201912/water-cooperation-diplomacy-source-sea (last accessed 05/12/2019)

seeing the WFD as the major driver for the improvement of water quality in recent years[361]. As stressed by experts interviewed during the consultation (including NGOs, Member States and industry associations), the power of a long-term binding policy target and framework beyond national election and policy cycles should not be underestimated and neither should the fact that Member States can be held legally accountable for the correct transposition and implementation of the EU water *acquis* (see also Section 5.1.3)[362]. Rather than being due to shortcomings in the legislation, the WFD's objectives have not yet been reached (see Sections 5.1.1 and 5.1.3) largely due to insufficient funding, insufficient implementation (basic and supplementary measures) and insufficient integration of environmental objectives in sectoral policies. This picture in fact confirms the need to set objectives at EU level that are in line with societal needs (see also Section 5.4.1).

On the Floods Directive, putting in place minimum requirements enforceable by law, ensured that progress in the Member States is at a comparable level and takes place within comparable timeframes. Indeed, the analysis carried out for this fitness check found that at least three Member States did not have a flood risk management process in place before 2007 at all and were not likely to develop one either[363]. As a result, requiring a good practice approach to flood risk management has increased the average level of flood risk management planning across the EU[364], with improved information to the authorities and to the public and reduced risks overall as a result. However, as there is no information available on the baseline policy situation before each country's adoption of the Directive, there is no information available on the *magnitude* of the effect.

Benefits of cooperation on technical aspects

One practical example of the EU added value of the Environmental Quality Standards Directive is that it has most likely meant that the Member States have avoided considerable duplication of scientific, administrative and legislative efforts. In particular, the work to prioritise substances and draw up and revise the watch list has led to knowledge sharing, including on analytical methods for the monitoring of certain chemicals in water, biota or sediments. Member States have also been prompted to collaborate on the derivation of EQSs for RBSPs. Not all Member States would have been in a position to acquire this knowledge, not least because of the potential cost. Furthermore, without the Directive, Member States would have had to develop their own standards.

The added value of joint work at EU level to identify problematic substances and develop standards can reasonably be assumed. This assumption is based on the fact that for the Groundwater Directive, Member States chose a similar approach to that for the EQSD and worked on a voluntary basis with the Commission to establish a watch list for groundwater pollutants. For example, a total of 11 Member States or participating countries have provided monitoring data on voluntary basis on per- and polyfluoroalkyl substances (PFAs) and 13 have done so for pharmaceuticals. The Commission has supported the process on an ad hoc basis with limited resources. A long-term commitment of resources and additional scientific

[361] NGOs (76% of 69 respondents), public authorities (65% of 69 respondents) and EU citizens (61% of 226 respondents) gave the highest proportion of positive responses to the value added by the WFD.
[362] Trinomics and Wood (2019).
[363] Trinomics and Wood (2019).
[364] Over 8,000 areas of potential significant flood risk have been identified since 2010 throughout the EU.

support are therefore needed. This would be of particular importance for proposing sound European quality standards for potential pollutants to be included in Annex I to the GWD[365].

6. Conclusions

This fitness check assessed how a significant part of EU water law — the Water Framework Directive, the Environmental Quality Standards Directive, the Groundwater Directive, and the Floods Directive — has functioned to date (considering the Directives' intervention logic), whether it has lived up to its intentions, and whether or not it is still fit for purpose. The findings of the fitness check draw on the results of an extensive consultation process with stakeholders and the public, a support study including a large literature review, and other sources. Participation in the public consultation was significant with around 370,000 responses, with more than 368,000 responses identified as being part of campaigns promoted by several environmental organisations. The fitness check was carried out in parallel to the evaluation of the Urban Waste Water Treatment Directive.

The key findings of this fitness check to a large degree concur with the overall findings of the recent evaluation of the 7th environment action programme[366], identifying the main challenges for EU environment policy as: (i) a lack of ambition in the implementation of measures; (ii) a lack of targeted investment; and (iii) insufficient integration with other sectoral policies.

6.1. Key points regarding the evaluation criteria

Effectiveness

The objectives of the Water Framework Directive include: (i) ensuring that the status of water bodies does not deteriorate; (ii) achieving good status for water bodies; and (iii) establishing a framework to protect EU waters. The WFD and the Floods Directive have been successful in setting up a governance framework for integrated water management. This includes evidence-based policy-making based on monitoring data, management per river basin district, increased transboundary cooperation and public participation.

The WFD, the Environmental Quality Standards Directive and the Groundwater Directive have considerably improved knowledge of and data about pollutants in water and aquatic ecosystems. The monitoring requirements included in the WFD and EQSD have led to very significant developments in analytical methods for certain substances.

However, progress towards good status of EU water bodies has been slower than anticipated. Factors to consider in this context are:

- the 'one-out-all-out' principle (all quality parameters measured for a river or lake need to be at a certain level for the overall status to be 'good');
- ubiquitous, persistent bioaccumulative and toxic substances (including legacy pollution);

[365] Annexes I and II are two of the supporting annexes to the GWD. Annex I establishes groundwater quality standards that must be applied as part of the assessment of chemical status for groundwater bodies, while Annex II identifies a minimum list of pollutants or indicators of pollution for which Member States have to establish their own standards.

[366] European Commission, COM(2019) 233 final.

- long time lags for ecosystem restoration[367]; and
- the fact that achieving the WFD's environmental objectives is conditional on full implementation of a number of other pieces of EU law such as the Urban Waste Water Treatment Directive and the Nitrates Directive, which appear as 'basic measures' in the programmes of measures.

In spite of this slow progress some improvements have taken place, for example a reduction in the number of water bodies failing to meet standards for several metals which are listed as priority substances. For groundwater, progress is slower due to the low flow rates, but improvements can be observed, and groundwater is overall in comparatively better status than surface water. .

For the Floods Directive, all Member States have taken action and are in the middle of the first flood risk management plan implementation period (2016-2021). They have set flood risk objectives and are implementing measures to achieve these. No information is available yet on the degree of flood risk reduction achieved.

Factors that have contributed to the effectiveness of the Directives include:

- the legal link to the WFD's objectives in other EU policies;
- EU funding;
- enforcement and access to justice;
- the widely applicable non-deterioration principle and increased knowledge; and
- data about the functioning of aquatic ecosystems.

The common implementation strategy, the dedicated implementation structure set up by Member States and the Commission, has significantly contributed to the harmonisation of methodologies and exchange of good practices through the development of extensive guidance, including for the Floods Directive.

Factors that have hindered the achievement of better results include the fact that those involved underestimated the efforts needed to establish a governance framework that takes into account the Member State-specific conditions. In addition, good status depends not only on mitigation measures to address current pressures, but also on restoration measures to address pressures from the past, including hydromorphological changes and chemical pollution. The lack of funding is a major obstacle for both the WFD and the FD. Member States' programmes of measures are often insufficiently based on the analysis of pressures and impacts, and there is a tendency to rely on easy technological fixes that address point source pollution while leaving other sources of pollution largely untargeted. Finally, good status of water bodies also critically depends on the integration of water objectives in other policy areas such agriculture, energy or transport, something which is not always the case.

Efficiency

Accurately quantifying **costs** and benefits related to the WFD and the FD specifically is challenging. The costs of WFD-specific measures reported by Member States in the second cycle of RBMPs are €13.8 billion per year, less than 0.1% of EU GDP. This number does not include the cost of all measures to be taken to close the implementation gap, so it should be

[367] Of the respondents to the public consultation (n=516), 86% consider EU water legislation to have been moderately to very effective in preventing deterioration of status. Of those responses (n=443), most come from EU citizens (38%) and industry (28%).

seen as an underestimation. Studies on the value of ecosystem services and the restoration of rivers indicate that the benefits of measures to improve the status of water bodies outweigh the costs and that citizens' willingness to pay exceeds current expenditure on water measures. The avoided costs to business thanks to water being of good quality and quantity are also significant. According to the costs of measures reported in the FRMPs, Member States should invest upwards of €12.5 billion between 2016 and 2021 on flood protection, prevention and preparedness.

The objectives for programmes of measures for river basin districts are mostly determined by what can be delivered with budgets and policies already in place. Insufficient use is made of the principle of cost recovery, while exemptions based on disproportionate costs are not always adequately justified. Factors that can lower the cost of implementation include:

- identifying the appropriate measures based on integrated water management;
- the use of cost-effectiveness analysis;
- reduction of pollution at source;
- the use of green infrastructure; and
- water efficiency.

Good practices exist but there is still significant room for improvement.

The monitoring requirements introduced by the WFD aim to provide a clear and comprehensive overview of the status and pressures within each river basin district. These monitoring requirements have led to a significant knowledge base that has also fed into other policies. Nonetheless, gaps still exist, mostly due to lack of capacity and resources. The Directives' extensive reporting requirements are necessary because of the high degree of flexibility of the framework approach: to be cost-effective water management needs to be adapted to the local circumstances, yet to keep an overview on compliance, i.e. whether the objectives are being reached and whether the right methodologies are being used, reporting is indispensable. There is no evidence of excessive administrative burden in terms of monitoring and reporting requirements. Having said that, citizens, Member State representatives, environmental groups and the water sector have indicated that there is room for improvement, both in the accessibility of information and in the level of detail. The requirement to hold a public consultation as part of the integrated water management approach is useful to gather expertise and improve stakeholder acceptance; this has led to tangible improvements in the RBMPs. The public consultation requirement as such has not been challenged, but some authorities have criticised as too long the prescribed length of the first two stages (the work programme and the overview of significant issues). Respondents who participated in the campaign organised by environmental organisations acknowledged that the public consultation requirement has led to substantial improvement in transparency and public participation, but indicate that the consultations insufficiently involve environmental groups and the general public.

Coherence

Having been devised in sequence and complementary to each other, the WFD, EQSD, GWD and FD form for the most part an internally coherent package. The main issue identified on internal coherence relates to chemicals. Whereas the quality standards for 'priority substances and certain other pollutants' are set uniformly at EU level, the identification of, and derivation of quality standards for, river basin-specific pollutants are conducted at Member State level in line with the subsidiarity principle. In practice, variability in the number of

substances identified as RBSPs is larger than can be explained by national circumstances. There are also significant differences between the environmental quality standards set by different Member States for the same substances. This is an instance where the flexibility left to the Member States has led to sub-optimal results.

The Directives are largely coherent with and complementary to the EU's wider climate and environmental policy, even though there is still room to increase synergies and streamline implementation, for example with (other) EU chemicals legislation.

On EU sectoral policies, progress has been made on better integration of water-related issues, thanks to the adoption of the water legislation and of instruments to reduce the impact of economic activities on water. However, there are still issues of incoherence with sectoral policies, for example on agriculture, energy and transport, and these can hinder the achievement of the objectives of the WFD and daughter directives. Full integration of the WFD and daughter directives' objectives into the strategic orientations and incentives of the economic sectors responsible for the main pressures on water is not yet fully achieved. In some sectors, this would require a paradigm shift in approach.

The Directives are fully coherent with the EU's international obligations related to water such as the 2030 Agenda for Sustainable Development, the UNECE Water Convention, the Regional Sea Conventions and the Sendai Framework for Disaster Risk Reduction.

Relevance

Water is an essential societal need. The importance of the policy challenges related to water and floods has been confirmed by various international institutions, including the OECD, the World Economic Forum and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). The relevance of the Directives to EU citizens has also been confirmed by more than 368,000 people who participated in the WWF #ProtectWater campaign, stating that they are opposed to changing the WFD and want to see its high standards upheld and met across Europe.

The objectives of the Directives covered by this fitness check are as relevant now as they were when the Directives were adopted, if not more so. They contribute to improving the situation with regard to six of the nine planetary boundaries (freshwater use, nitrogen and phosphorus cycles, ocean acidification, chemical pollution, biodiversity and climate change).

The Directives' in-built flexibility and cyclicality leaves sufficient room also for emerging concerns to be adequately addressed, such as the threat from climate change and its impact on water quantity in particular but also on water quality; or from water pollution by new pollutants such as (micro)plastics or pharmaceuticals. The process of keeping up with science has proven to be slower than anticipated, in particular for the EQSD and the updating of relevant substances. In addition, the EQSD does not address mixtures of substances.

EU added value

60% of the EU's territory lies in river basins that cross at least one national border. This fitness check confirms that the Directives have led to stronger transboundary cooperation and to a higher level of ambition for the environmental objectives for water bodies and flood risk management than could have been expected without them. At the same time, the Directives leave sufficient flexibility to the Member States to adapt water management to local conditions, in line with the principle of subsidiarity.

6.2. Key issues per directive

Water Framework Directive

Deadlines and exemptions

The 2015 timeline for good status has not been met for a majority of water bodies, leaving more than half under one of the Directive's exemptions. The challenges faced by Member States are therefore more than substantial. While the conditions for application of the various exemptions have been clarified somewhat over time, the justifications provided by Member States are often too generic, and the provisions on exemptions have been interpreted in very different ways.

The possibilities for exemptions are reduced after 2027, as time extensions under Article 4(4) can only be authorised in cases where all the measures have been put in place but the natural conditions are such that the objectives cannot be achieved by 2027. The next round of river basin management plans and programmes of measures will play a key role in ensuring the necessary progress towards achieving the environmental objectives by the 2027 deadline. To support and steer Member States in the process, the Commission formulated recommendations addressed to all of them in its latest implementation report, complemented by Member State-specific recommendations. The EU recommendations call on Member States to: (i) continue improving stakeholder involvement; (ii) clearly identify the gap to good status for individual pressures and water bodies and design, fund and implement targeted PoMs to close it; (iii) reduce reliance on exemptions and improve transparency in relation to the justifications used; and (iv) ensure the proper implementation of cost recovery.

The non-deterioration objective

One factor that has contributed to the effectiveness of the WFD is the fact that its environmental objectives, and in particular the non-deterioration objective, are not merely objectives for management planning, but also apply to individual projects, as confirmed in the Court of Justice's Weser ruling. Industry representatives find that the non-deterioration objective leads to uncertainty and excessive precaution in the permit schemes in some Member States. However, the strict one-out-all-out approach is not as strict as it may seem, as not every little decline in one of the quality elements causes a deterioration in class, since classes are defined as 'ranges'.

The one-out-all-out principle

Views from the public consultation are split on the appropriateness of the principle of 'one out all out'. While the one-out-all-out principle is broadly supported by respondents from NGOs and via the campaign, representatives of industry and agriculture raised concerns that applying the principle makes it more difficult to show progress resulting from investments in water quality. Given the importance of better communicating progress to citizens and stakeholders, work has begun to facilitate more detailed communication about the state of water.

Ubiquitous persistent bioaccumulative and toxic substances

A limited number of ubiquitous substances, such as mercury and other persistent pollutants, are largely responsible for good chemical status not being achieved in surface waters. While significant progress is being made in addressing both European and (to some extent) global sources, concentrations are expected to reduce only very slowly over time.

Integration in other policy areas

The WFD offers the necessary instruments to reconcile the objectives of other sectoral policies. However, in practice the integration of the WFD objectives with other sectors has been difficult. This fitness check concluded that there are trade-offs to be explored between the WFD's objectives and pressures arising from sectors such as:

- agriculture (strong pressures from nitrates and pesticides and from water abstraction);
- energy/climate (including generation of hydropower and production of biomass for energy);
- transport; and
- non-energy raw materials.

It will need to be explored how to best ensure synergies. The enhanced conditionality in the Commission proposal for the future of the common agricultural policy and the higher ambition for environment and climate (including the WFD) could ensure stronger synergies between the CAP and the WFD. However, Member States' implementation choices are expected to remain a decisive factor in whether or not these synergies are successfully achieved.

Enforcement

Enforcement at EU level has focussed mostly on the formal or procedural requirements, and on 'systematic' cases of incorrect implementation ('pilot' cases to test the interpretation, issue arising in more than one Member State), e.g. on water pricing, small hydropower, nutrient pollution, insufficient justification of exemptions.

Legal enforcement of the WFD is above all the Member States' responsibility. Legal enforcement largely depends on the possibility for interested parties to take part in and control decision-making through national administrative or judicial review procedures and access to justice. Enforcement also rests on a national system of inspections to detect non-compliance and ensure appropriate follow-up. Civil society representatives claim that there is a need to improve access to and effectiveness of national enforcement procedures, as well as to have better organised systems of inspections and more effective penalties.

Emerging challenges

The WFD is sufficiently prescriptive with the pressures to be addressed, and yet flexible enough to reinforce its implementation as necessary with regard to emerging challenges not explicitly mentioned in the legislative texts, such as climate change, water scarcity and pollutants of emerging concern (e.g. micro-plastics). The mechanism whereby management plans are periodically revised based on an analysis of drivers and pressures can therefore deal with these newly identified pressures. However, integration of these pollutants of emerging concern in RBMPs has been quite limited so far and will require far greater attention in the future. Properly accounting for the existing chemicals and their mixtures in water, and adding emerging pressures to well-established ones, could raise the profile of pollutants of emerging concern in terms of implementation. These findings are consistent with the findings of the evaluation of the UWWTD, which also identified contaminants of emerging concern as an increasingly important problem. Waste water treatment reduces the amount of some contaminants of emerging concern entering the aquatic environment, but upstream solutions are essential, particularly for diffuse source pollutants.

The Directive provides a comprehensive framework for protecting and managing the quantitative aspects of water bodies. Sound water management requires joint management of qualitative and quantitative aspects, the latter being implicit in the definition of good ecological status and explicit in hydromorphological elements (i.e. flow regime). Furthermore, good quantitative status is required for groundwater, where Member States must ensure a balance between water abstraction and recharge rates. As quantitative issues in particular are bound to become yet more salient in the coming period due to the impacts of climate change, Member States will need to make the best possible use of the framework offered by the WFD to address them. It is worth exploring how this process can be facilitated at EU level.

Monitoring and reporting

The Commission's analysis of the first and second cycles of RBMPs concluded that in most Member States there is still insufficient monitoring to allow for appropriate characterisation of water bodies. For some types of data, the uptake of innovative monitoring technologies, including satellite data and automated monitoring technologies, has great potential to improve data collection, reduce the costs of monitoring and enhance confidence in WFD status classification.

Reporting cycles are not fully aligned between different directives, as also previously indicated in the fitness check on environmental monitoring and reporting. Many feel reporting should be further simplified and automatised as the current system is seen as too extensive and resource demanding. Scope for streamlining should therefore be further explored.

Progress has been made in moving towards digitalisation of the reporting and visualisation of results (e.g. moving from reporting to harvesting of data, allowing re-use of data), but the potential is far from fully exploited. Electronic reporting has also proved to be a useful tool for communication and comparison purposes between planning cycles. In some Member States, digital solutions have helped to reduce the administrative burden further, but further potential remains. To tap into this potential, available EU funds such as the Digital Europe programme[368] can support Member States in this transition.

Environmental Quality Standards Directive

The list of priority substances was identified by respondents in the public consultation[369] as one of the factors that contributed the most to progress towards the WFD's objectives. The stakeholder categories that were the most positive included EU citizens, environmental organisations and industry/industry associations.

The lengthy six-year cycles to update the priority substance list means that new substances cannot be added swiftly to the list. Furthermore, the prioritisation exercise and determination of EQSs for the priority substances is a complex process which requires expertise and time to gather and assess the scientific information and to put in place monitoring for the new substances. All opportunities for strengthening the involvement of EU agencies with relevant expertise in this process should be explored to reinforce the capacity and increase efficiency.

[368] COM/2018/434 final — 2018/0227 (COD).

[369] 40% (274 out of 675) of respondents indicated that the list 'substantially' contributed to meeting the objectives of the Directives.

The setting-up of a watch list was generally welcomed by most contributors to the consultation[370]. While the watch list has been helpful in identifying relevant pollutants, the relationship between the watch list and prioritisation process for priority substances could be improved.

The list of priority substances was revised in 2013, with all existing priority substances retained because they could still pose a risk due to their persistence or ongoing use. However, it may be possible to remove some when the list is next revised. The approach to listing and monitoring specific individual substances (as opposed to mixtures of substances or measuring the combined effect rather than individual concentrations) has proven to be ineffective at catching the effects of combinations of chemicals and possible substitutes for the active substance. Work is ongoing to explore the feasibility and the practical implications of taking a more holistic effect-based approach.

To address the emerging issue of pharmaceuticals, the Commission adopted a Communication on an EU Strategic Approach to Pharmaceuticals in the Environment in March 2019.

Groundwater Directive

Overall, the GWD has been successful in setting specific objectives, protecting groundwater resources and avoiding their deterioration. Although groundwater presents a slow onset of impacts, and measures require time to take effect, groundwater bodies are generally in better status than surface waters at EU level.

The GWD has been particularly useful in setting details for addressing chemical pollution of groundwater and setting the necessary requirements to control upward trends of pollutants, while providing a definition of starting points for trend reversal and requiring Member States to take action when a risk is detected.

Annex II to the GWD sets a minimum list of pollutants that could cause a risk that the objectives will not be met; for these, threshold values (quality standards) have to be set by Member States. There is, however, very large variability in the ranges of threshold values across the EU. This in part can be due to the flexibility the Directive allows when it comes to setting the values, taking several factors into consideration (e.g. receptors, risks, pollutants, background levels). However, the wide range of threshold values is much larger than what can be explained by local differences. This issue is being addressed through the 2014 review of the GWD and the on-going technical works to better harmonise values.

Overall, it appears from the feedback from stakeholders throughout the consultation that more time is needed to assess whether the parameters included in the annexes are pertinent, as the last update entered into force in 2016.

The process of keeping up with science has largely occurred thanks to the voluntary engagement of Member States and stakeholders who supported the Commission. The potential for more secure long-term technical and scientific support to carry out such updates should be explored, as should the potential for a more efficient manner in which to update the

[370] Of the respondents to the relevant question in the expert part of the public consultation (n=550), 49% considered the surface water watch list monitoring requirements to be appropriate for the intended purpose. A higher proportion of NGOs (69%, n=51) and environmental organisations (66%, n=29) than EU citizens (46%, n=199) responded 'yes' on this aspect.

annexes. The fact that a voluntary process for establishing a watch list has been set in motion shows the value Member States attach to the objectives of the Directive.

Floods Directive

The FD has introduced a flexible and integrated approach to floods management in the EU, in line with the principle of subsidiarity. The approach includes prevention, preparedness and protection, covers the whole catchment and coasts, and provides the opportunity to take into account uncertainties through its cyclical approach. The Directive has successfully achieved its objective to put in place an effective governance framework.

All Member States have set objectives, and most of them have put in place a monitoring system. Due to the Directive's early stage of implementation, there is no information yet on whether it has achieved its objective to reduce damage via concrete measures. With the first cycle concluded, Member States will need to implement additional elements, such as implementing the measures of the first and subsequent cycles, assessing progress towards reaching the objectives and the likely imminently worsening impact of climate change. Implementation of these additional elements will need to start from Member States' second preliminary flood risk assessments and FRMPs onwards. The full potential of the Floods Directive can thus only be reached in the future.

Citizens, experts and officials contributing to the public consultation found that the Directive has improved flood risk management. There is, however, scope to strengthen awareness and foster synergies between the Directive, the various pieces of water law and other related EU-level instruments. In addition, the knowledge and modelling of the impact of climate change on all sources of floods should also be improved.

The analysis in this fitness check did not find evidence that the Floods Directive creates unnecessary administrative burden. Cost-benefit ratios differ for every project, but are found to be higher than 1 and to pay back several times over.

6.3. Lessons learned for future follow-up

The insufficient level of implementation by Member States and by those sectors of the economy with an impact on water has come to the forefront across the different criteria of evaluation and for all Directives, and is at odds with the widespread support for the water *acquis*. Any follow-up to this fitness check will need to explore how best to facilitate significant acceleration of implementation towards reaching the Directives' objectives and whether new methods or forums to support compliance promotion could contribute to this.

It would seem beneficial to reflect with all concerned on progress towards implementation of measures. Such reflection should focus on how to assess the effectiveness of the measures being put into operation, and whether they are sufficient to achieve the objectives. Identifying and applying innovative technology aiding the cause of the WFD can also play a role in advancing towards the 2027 deadline.

Enhanced awareness raising, training and education, access to justice and public participation will also be key factors, considering the important role citizens and businesses play as agents for transformation. The national courts must play an important role in ensuring effective implementation of the Directives, complemented by enforcement at EU level where warranted.

For both the EQSD and the GWD, the potential for streamlined methods to prepare updates in line with scientific developments should be explored.

To achieve sustainable protection and use of water resources, which will become even more important due to climate change, it is particularly relevant to ensure a balanced and coherent approach to the sometimes competing uses of water by different sectors. Energy and agriculture are particularly pertinent in this respect. It will also be necessary to consider how further integration of the Directives with other policy areas can best be advanced in a mutually supportive way; this is especially important in view of the emerging challenges for water management caused by climate change and pollutants of emerging concern. Work in this field includes the allocation of funds under other policies in a way that promotes, and in no way hinders, the achievement of the Directives' objectives.

To address the financing gap, implementation of water policy requires considerable investment as well as operation and maintenance financing. While national contributions should play the principal role, EU funding has played a considerable role, often as part of the cohesion policy funds and in the accession process, as well as through the common agriculture policy. International financial institutions (the EIB, the EBRD, the World Bank) have also invested heavily in this sector. Insufficient implementation of the Water Framework Directive's Article 9 provisions on cost recovery and water pricing deprives Member States of a potential source of revenue to finance measures, which generates a hidden cost for society.

This fitness check also concluded that there is limited room for simplification and reduction of the Directives' administrative burden without jeopardising their objectives. Some further streamlining of monitoring and electronic reporting, together with a continuation of the ongoing digitalisation, could help alleviate the required administrative effort.

7. Annexes

Annex 1 - Procedural information

1.1. Lead DGs and internal references

This evaluation is led by DG Environment. It was included as item PLAN/2017/1661 in the DECIDE/Agenda Planning database.

1.2. Organisation of the work and timing

The Commission announced this fitness check in October 2017 with the publication of the roadmap. The roadmap received 82 contributions during the feedback period[371], with wide participation from Member States' national and regional authorities, industrial and economic representatives, and environmental organisations (see Annex 2 for details). The roadmap set out the evaluation framework and the scope for this fitness check, and the Commission prepared a number of general evaluation questions to assess the evaluation criteria. These were then broken down into more targeted questions to make the analysis more specific (see Annex 3).

In 2018, to support this fitness check, the Commission awarded a study contract to a consortium of experts led by Trinomics and Wood (formerly Amec Foster Wheeler). The consortium worked in close cooperation with the Commission throughout the different phases of the study. The objective of the study was to provide support to the Commission evaluation of the effectiveness, efficiency, relevance, coherence and EU added value of the Water Framework Directive, its daughter directives the Groundwater Directive and the Environmental Quality Standards Directive, and the Floods Directive. This work included the consultation activities.

In 2017, a steering group comprising all relevant Commission services (Interservice Group, ISG) was set up to oversee and contribute to the evaluation and its conclusions. The ISG was set up jointly for this fitness check and for the evaluation of the Urban Waste Water Treatment Directive, acknowledging the significant links between the two evaluations. This was also to ensure that the group tackled both processes in an efficient manner.

The following Directorate-Generals were represented:

Secretariat-General (SG)
Legal Service (SJ)
Agriculture and Rural Development (AGRI)
Climate Action (CLIMA)
Communications Network, Content and Technology (CNECT)
Economic and Financial Affairs (ECFIN)
Environment (ENV)
Employment, Social Affairs and Inclusion (EMPL)
Energy (ENER)
European Neighbourhood Policy and Enlargement Negotiations (NEAR)
European Civil Protection and Humanitarian Aid Operations (ECHO)
Financial Stability, Financial Services and Capital Markets Union (FISMA)
Health and Food Safety (SANTE)

[371] https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5128184/feedback_en?p_id=122600.

Internal Market, Industry, Entrepreneurship and SMEs (GROW)
Joint Research Centre (JRC)
Justice and Consumers (JUST)
Maritime Affairs and Fisheries (MARE)
Migration and Home Affairs (HOME)
Mobility and Transports (MOVE)
Regional and Urban Policy (REGIO)
Trade (TRADE)
Research and Innovation (RTD)

The group met four times during the evaluation process. On a number of deliverables, the group was consulted in writing. The members of the group were invited to all events organised in the context of the consultation process described in Annex 2.

Table 1 ISG meeting dates and topics of discussion

DATE	***TOPICS OF DISCUSSION***
8 November 2017	First ISG meeting
3 April 2019	Second ISG meeting
27 May 2019	Third ISG meeting
1 October 2019	Fourth ISG meeting

In addition to the meetings, the ISG was regularly kept informed and consulted in writing on the different steps of the process. These were chiefly the following: (i) the overall process and roadmap; (ii) the consultation strategy; (iii) the terms of reference of the support study; (iv) the draft public consultation questionnaire; (v) the results of the consultation activities; (vi) the draft staff working document and revised draft staff working document following the opinion of the Regulatory Scrutiny Board.

1.3. Exceptions to the Better Regulation Guidelines

No exceptions were made to the Better Regulation Guidelines[372] during this fitness check.

1.4. Consultation of the Regulatory Scrutiny Board

The Regulatory Scrutiny Board (RSB) delivered a positive opinion with comments on 15 November 2019. The following table provides information on how the RSB's comments have been addressed in this staff working document.

RSB comments	**Reflection in text**
The report does not discuss whether Member States tend to have the same implementation problems or different ones.	Clarifications have been added to Sections 5.1.1 and 5.1.3. It has now been made clearer that some issues are location-specific, while others, such as insufficient finance or integration of water objectives in sectoral policies, are common to all Member States.
The report does not comprehensively assess the administrative burden of the various elements of the Water Framework Directive.	Section 5.2.3 explains that the Directives entail comprehensive monitoring and reporting requirements, which are mostly functional instruments to increase the effectiveness and efficiency of the measures. Likewise, Section 5.1.2 explains that integrated water management requires the necessary knowledge and cross-boundary collaboration, which inevitably entails some additional administrative processes.

[372] https://ec.europa.eu/info/better-regulation-guidelines-and-toolbox_en

RSB comments	Reflection in text
The fitness check does not explain why the (self-) financing model of the Water Framework Directive had only limited success in solving funding problems.	Clarifications have been added in Section 5.2.1 on why the implementation of the cost recovery principle has been uneven and incomplete. Furthermore, in the sub-section on the financing of measures, the report explains that public investments are justified for water use activities for which the costs cannot be recovered.
The report should analyse why the implementation of various elements is so mixed across Member States, i.e. whether Member States struggle with the same or different problems. For example, is there more political will in some Member States to implement the provisions on cost recovery and water pricing, or do they simply face fewer practical obstacles? The report should not advocate for a more uniform approach unless it can show that the variation across countries stems from something else besides different local situations.	The issue of the variability in implementation between Member States has been clarified in Section 5.1.1. The reasons for the differences in the rate of cost recovery have been clarified in Section 5.2.1.
Many elements of the Water Framework Directive produce an administrative burden, for example, maintaining cross-border governance structures, drawing up plans, assessing pressures and impacts, doing economic analysis on water uses, doing monitoring and reporting, etc. The report should analyse systematically where the burden is disproportionate and the analysis could be simplified.	Section 5.2.3 set out that the fitness check on environmental monitoring and reporting estimated the administrative burden for the WFD as 'fairly large' and at the same level as many other environmental Directives. For the FD and the EQSD, the administrative burden was estimated to be 'moderate'. Section 5.2.3 further also explains that some of the administrative requirements are necessary to keep the policy discretion provided by the Directives in check and to provide transparency to citizens.
The conclusion on the extent to which the Water Framework Directive was able to address deterioration of water quality needs to be consistent across the report, including in the executive summary.	The section on non-deterioration has been redrafted to ensure consistency throughout the report and the wording in the executive summary has been changed.
The report should be shortened. It is still very long. Readability would be improved with less bold type. A greater effort to make the executive summary simpler and more understandable would help communication of the results of the evaluation.	The report has been thoroughly edited by the Commission's Editing Service. While this has only shortened the text in certain sections, it has greatly increased the readability of the report in its integrity. The excessive use of bold has been removed and the executive summary has been edited to make it more accessible to non-experts.

The Regulatory Scrutiny Board had previously provided a negative opinion with comments on 19 July 2019. The following table provides information on how the comments made were addressed in this staff working document:

RSB comments	Reflection in text
The report does not clearly set out the objectives of the Water Framework Directive. It does not objectively assess the success of the Directive against these.	The objectives of the WFD and other Directives covered by the fitness check are now clearly explained in Section 2.1 (Description of the Directives and their objectives). The analysis of progress towards the objectives is now more balanced throughout the SWD.

RSB comments	Reflection in text
The report should not give the objective of halting deterioration of water quality more weight than the other objectives of the Water Framework Directive, in particular, achieving good environmental status by 2015.	Progress towards reaching the individual objectives (non-deterioration, good status, etc.) is now covered in detail in the section on effectiveness (Section 5.1 Question 1 assesses performance in terms of the objectives; Question 2 analyses in how far the governance structures intended by the Directives have been set up). In addition, the assessment of relevance (Section 5.4) puts the objectives into the perspective of new developments (such as climate change and new pollutants).
Especially in the conclusions and the executive summary, the report should objectively describe which objectives were largely met (for example, setting up a monitoring system, drafting cross-border plans for river basins, halting deterioration) and which objectives were not or only partially met (for example, implementing the most cost-efficient measures, triggering additional investments, achieving good environmental status).	The executive summary and conclusions have been substantially redrafted to reflect the updated analysis following the comments from the RSB. They now include both a summary of the state of play and of the results of the fitness check process and its assessment of the five evaluation criteria.
The report does not adequately examine why the objective to achieve good environmental status in 2015 was missed.	More qualitative information on the gaps in implementation and reasons behind is now included in Section 2 (state of implementation), drawing on the analysis of the Commission's latest implementation report.
The report should analyse why the target date of achieving good environmental status in 2015 was missed. It could more clearly explain that it takes time before measures show their full effect, so that in hindsight the target may have been unrealistic.	Question 3 in the effectiveness section (Section 5.1) elaborates on the factors that have contributed to the delays in achieving good status for all water bodies (factors that stood in the way), e.g. by looking at the one-out-all-out principle and the slow response time of nature.
In order to manage expectations for the future, the report should discuss to what extent current measures are on track to achieve good environmental status by 2027.	An assessment of the suitability of the current measures to achieve the environmental objectives is now included in the effectiveness section (Section 5.1 Question 3). In addition, the crucial role of the third river basin management plans and programmes of measures (due in 2021) in setting the course for the 2027 deadline is now highlighted (in Section 3.2 Assessment of second river basin management plans and first flood risk management plans).
The report should also explain how the impact of the Water Framework Directive depends on the implementation of other legislation, for example on agriculture.	More accessible information on how source legislation interacts with the Water Directives, notably the concept of 'basic measures', is included in Section 2.2 on integrated water and floods management (for example, the Nitrates Directive). The fact that the implementation crucially depends on the implementation of other sectoral policies is then explained in detail in the coherence section (Section 5.3 Question 2).

RSB comments	Reflection in text
The report does not sufficiently assess the effectiveness and room for simplification of the planning and monitoring processes set up under the Directives.	The effectiveness of the monitoring requirements of the Directives is now assessed with more clarity in the effectiveness section (Section 5.1 Question 3); notably it is explained how increased knowledge from monitoring impacts on effectiveness. The efficiency section discusses the possibilities for simplifying the planning/reporting and monitoring processes (Section 5.2 Question 4).
The report treats putting in place a system for monitoring, reporting and drafting plans as an end, and hence a success, in itself.	The language of the SWD has been changed to make clear that monitoring, reporting and drafting plans are instruments to translate the objectives of the Directives into results and impacts and not an end in themselves. This is now stated in the intervention logic (Section 2.3) and further analysed under: (i) effectiveness, in the part dealing with governance change (Section 5.1 Question 2); (ii) enabling factors (Question 3); and (iii) efficiency, with particular emphasis on the monitoring and reporting (Question 3).
The report should further discuss which of the mandatory river basin and flood risk management plans appear to have delivered effective measures to achieve better water quality and quantity and decrease flood risk.	Changes have been made in the intervention logic (Section 2.3), making it clearer that RBMPs are tools that help Member States implement the correct measures to achieve the desired impacts. In the effectiveness section (Section 5.1 Question 2), concrete examples of successful measures are included to illustrate how progress towards the objectives can be made with individual measures.
The evaluation should report on any obstacles identified. It should explain what was missing in implementation to achieve the plans' objectives.	Section 3 (Implementation and state of play) sets out both how far the objectives have been achieved and what is still missing. This analysis is based on the findings of the EEA and the Commission's latest Water Framework Directive and Floods Directive implementation report (of February 2019). In addition, the effectiveness section (Section 5.1 Question 1) elaborates on the obstacles encountered and how they are linked to the Directives' performance.
Further considerations and adjustment requirements	
The evaluation should explain why the (self-) financing model of the Water Framework Directive had only limited success in solving funding problems.	The Section on efficiency (Section 5.2) has been redrafted to include a more detailed analysis of the implementation of the cost recovery principle and water pricing practices (Question 1).
The report should describe the problems that individual Member States face and discuss the reasons for these problems. Graphs and maps would also help to present the situation.	The analysis in Section 3.1 (State of European waters) has been refined and complemented, including with maps on status and bar charts on pressures per Member State. In addition, more explanatory text on why Member States experience problems in reaching the objectives has been added, drawing also on the Commission's analysis in its latest implementation report.
The narrative could explain that Member States had the freedom to decide how to achieve better water quality and quantity.	This point is addressed in Section 2 on the background to the initiative and in the efficiency section (Section 5.2 Question 2), notably by explaining the character of the Directive ('Framework Directive') and how Member States can implement it. The analysis of EU added value (Section 5.5) also briefly discusses the subsidiarity perspective.

RSB comments	Reflection in text
Based on the collected evidence, the report should draw operational conclusions on the deficiencies that would need to be tackled to achieve good water quality and quantity.	The analysis in the effectiveness section (Section 5.1) discusses this point, and Section 3.2 now includes a summary of the Commission's recommendations to Member States in its latest implementation report (of February 2019).
The efficiency analysis should discuss whether it is possible to simplify rules and reduce burdens without compromising the objectives.	The analysis in the efficiency section (Section 5.2 Question 4) now discusses a range of areas in the light of possibilities for simplification. While such simplification is already ongoing, further potential is identified.
It should also discuss the proportionality of the administrative burden for (regional and local) authorities.	The analysis in the efficiency section (Section 5.2 Question 4) now discusses in more detail the administrative burden and costs of the Directives, in particular with regard to reporting.
Given that the bulk of the responses of the public consultation were part of a campaign, it is particularly important not to aggregate across responses and to better indicate what is known about the views of different stakeholder groups.	Stakeholder responses have been described in more detail throughout, indicating as much as possible which group held a particular view. In addition, Annex 2 (Consultation activities — synopsis report) includes some further details, as well as a summary of the views expressed by those who participated in the consultation within the WWF campaign.
The report could be substantially shortened.	Compared to the previous draft, all redundancies and repetitions have been removed. The revised draft SWD now includes a lot more facts (e.g. from the EEA's State of Water report and the Commission's latest implementation report) and concrete examples (e.g. from the study contract), as well as pictures and graphs to better illustrate the arguments. While there has not been a substantial reduction in length, the document is 'lighter', with less dense text and more visual support.

1.5. Evidence, sources and quality

The evaluation was supported by a study that provided support focused on stakeholder consultation. The 'Fitness check (evaluation) of the Water Framework Directive and the Floods Directive' support study was completed in June 2019[373]. The support study sufficiently satisfies the necessary quality requirements.

The project included support for the stakeholder consultation (see Annex 2). In addition, many other sources were used, including reports from the European Environment Agency, the Commission's own implementation reports and several other studies (see Annex 4 for complete list).

[373] See Trinomics and Wood (2019).

Annex 2 - Consultation activities - synopsis report

Introduction

This synopsis report summarises the results of all of the consultation activities undertaken as part of the fitness check of the Water Framework Directive and the Floods Directive.

It provides an outline of the consultation strategy, describes the consultation activities undertaken, and presents the stakeholder groups that participated. It also includes a description of the methodology and tools used to process the data gathered. The results of each consultation activity are briefly presented. A list of all position papers submitted during the consultation is attached as an appendix, and the feedback received on the evaluation roadmap is summarised. Finally, this synopsis report explains how the information gathered during the consultation process has been used in the analysis.

The consultation strategy

The consultation strategy for the fitness check was published by the Commission in May 2018[374]. The consultation strategy targeted both the fitness check and the parallel evaluation of the Urban Waste Water Treatment Directive (UWWTD). As such, the consultation strategy was wide ranging, so as to cover several aspects of the EU water legislation. This synopsis report summarises those elements of the consultation strategy with particular relevance for the fitness check.

Objectives

The objectives of the consultation are set out below.

- To complement conclusions based on existing and already known data and literature.
- To gather further evidence to substantiate the analysis of relevance, effectiveness, efficiency, coherence and EU added value. Coherence and links with other EU legislation such as the UWWTD, the Nitrates Directive, the Bathing Water Directive and the Sewage Sludge Directive were regarded as particularly relevant and were specifically analysed.
- To gather additional information going beyond pure implementation information, thus helping to assess: (i) the functioning of the Directives; and (ii) the benefits and costs that different stakeholders attach to them.

Stakeholders

The following stakeholders were identified as relevant for the fitness check; all of them were consulted and their views recorded.

- Member States and their public authorities responsible for the environment, water management, health, infrastructure and urban planning, disasters, and economic uses of water. For the fitness check it was considered important to include International River Basin District Commissions as well.
- The working groups under the common implementation strategy.

[374] Fitness Check of the Water Framework Directive, its associated Directives and the Floods Directive, and Evaluation of the Urban Waste Water Treatment Directive, Consultation Strategy, http://ec.europa.eu/environment/water/water-urbanwaste/legislation/pdf/2018.04.20%20Consultation%20Strategy%20UWWTD_WFD_FD.pdf

- Industrial/economic actors, including SMEs, in sectors with an impact on water or that are affected by the Directives.
- NGOs and citizens' initiatives.
- International organisations relevant to the Directive, e.g. those providing funding, advice on health, technical or governance issues, or local implementation aid.
- Academia, research and innovation organisations and institutes.
- Citizens.

Methods for engagement

The consultation strategy planned to use the following methods to involve and interact with stakeholders; all of them were applied:

1. feedback on the evaluation roadmap;
2. an open public consultation through an online questionnaire, including expert consultation as part of the same exercise, using the Commission consultation's website;
3. targeted consultations including:
    - a targeted online survey;
    - focus groups;
    - stakeholder workshops;
    - interviews.

Public consultation

The public consultation aimed to gather the opinion of any interested citizen or organisation. It targeted in particular stakeholders that would be unlikely to be involved in the other, more specialist/targeted strands of the consultation activities.

The questionnaire was drafted to be accessible to the public. To this end, it included two parts:

- a general part, containing 28 questions, with a limited amount of technical language in relation to the Directives; and
- an expert part, containing 52 questions, which included more specific details and made reference to evaluation terminology (e.g. unintended effects, efficiency[375]).

The public consultation was held on the 'Have your say[376]' website between 17 September 2018 and 12 March 2019. The survey was available in 23 EU languages. To maximise the response rate, a number of organisations were also contacted directly and asked to help disseminate the link to the questionnaire.

All questions, except those identifying the respondent, were optional.

The consultation received 385,088 responses in total. The first step in the analysis of the responses was to remove duplicates (i.e. multiple identical responses from the same respondent). A total of 15,010 responses were removed, leaving 370,078 responses to analyse. Out of these, 368,764 responses were identified as being part of three different campaigns, while 1,944 responses were non-campaign responses. Out of these non-campaign

[375] https://ec.europa.eu/eusurvey/home/welcome
[376] https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5128184_en.

respondents, all provided some replies to Part I of the questionnaire, while less than half provided at least one reply to Part II of the consultation.

Campaign responses

The campaign with the greatest number of participants was the #ProtectWater campaign organised by the Worldwide Fund for Nature (WWF). This campaign supported a positive view of the Water Framework Directive and sought to ensure that: (i) the Directive remains intact; (ii) it is fully implemented by Member States; and (iii) it is enforced by the European Commission. The #ProtectWater campaign organisers guided respondents on how to reply to questions in both Parts I and II of the questionnaire. The WWF stated on its website that the campaign generated 375,386 replies. According to the results retrieved from the consultation, 368,303 respondents answered exactly as suggested by this campaign, with the following opinions:

- The approach set out in WFD is appropriate to prevent deterioration, restore freshwater ecosystems and ensure a reliable supply of clean water for all legitimate water uses. WFD led to more stringent national water protection laws to be adopted, and EU-level action is also justified because freshwater ecosystems do not recognise borders. WFD is flexible enough to accommodate socio-economic concerns, governance structures, local cultural preference and traditions.

- WFD remains relevant to addressing diverse pressures faced by EU waters and water-related societal and economic challenges (including climate change and new technological developments such as fracking). Describing ecosystem health with WFD's 'one-out-all-out principle' remains critical, as does the use of appropriate water pricing in line with polluter/user pays principle.

- Where properly implemented, WFD has proved to be effective in protecting and restoring freshwater ecosystems. The current poor state of EU waters is caused by my government's lack of ambition and political will to address the main pressures on our waters; it is NOT the result of WFD legal provisions and approach to water management.

- As well as protecting nature, WFD has added value to the economy and yielded additional social benefits (e.g. avoided costs for treatment of water, prevented economic losses due to droughts and floods, health benefits).

- WFD is coherent with other pieces of EU environmental law and supports EU economic development-related objectives. However, achievement of WFD objectives has been significantly undermined by unsustainable practices promoted under EU sectoral policies (esp. agriculture, energy, transport).

Two more campaigns in addition to the #ProtectWater campaign were identified and named as Campaign 2 and Campaign 3. These campaigns were unidentified because it is unclear which interest groups were responsible for preparing them.

Out of the 368,303 responses retrieved from WWF's #ProtectWater campaign, 361,275 (98%) were from EU Member States. Of the responses from the EU Member States, 46% were from Germany, 6% from the Netherlands, 5% from Austria, Sweden, Spain, Belgium and Italy each, 4% from France and Hungary each, 3% from Finland and the UK each, and

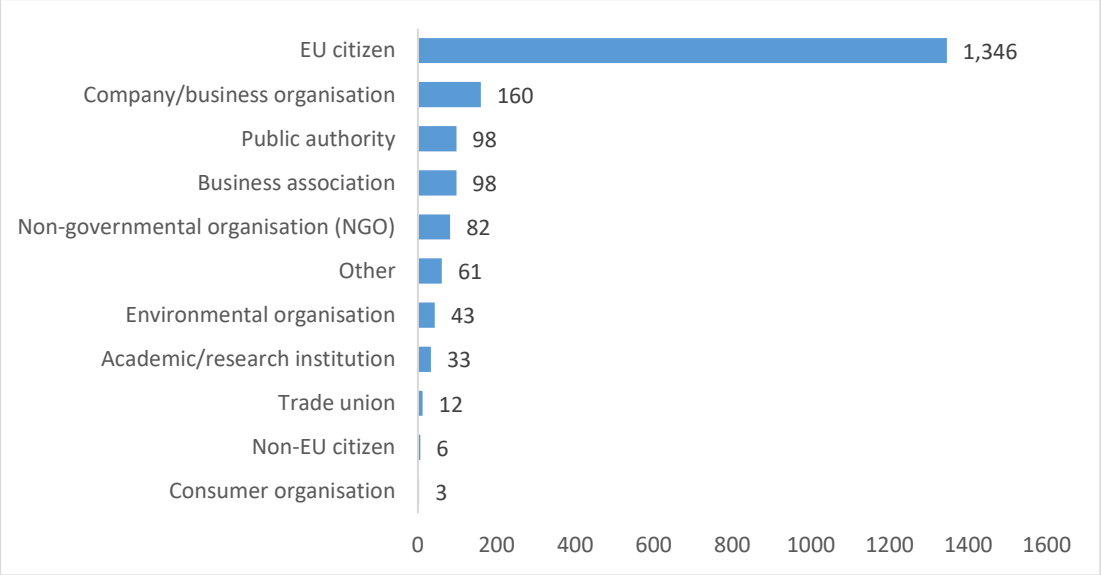
2% from Bulgaria and Poland each. The remaining responses were spread relatively evenly among the other EU Member States.

All the responses received from Campaign 2 were from EU Member States. Out of the 409 responses, 69% were from Germany, 30% were from Austria, and the remaining five responses were split between Bulgaria, Estonia, Greece and Belgium.

For Campaign 3, out of the 52 responses, 51 were from Germany and 1 was from a non-EU country.

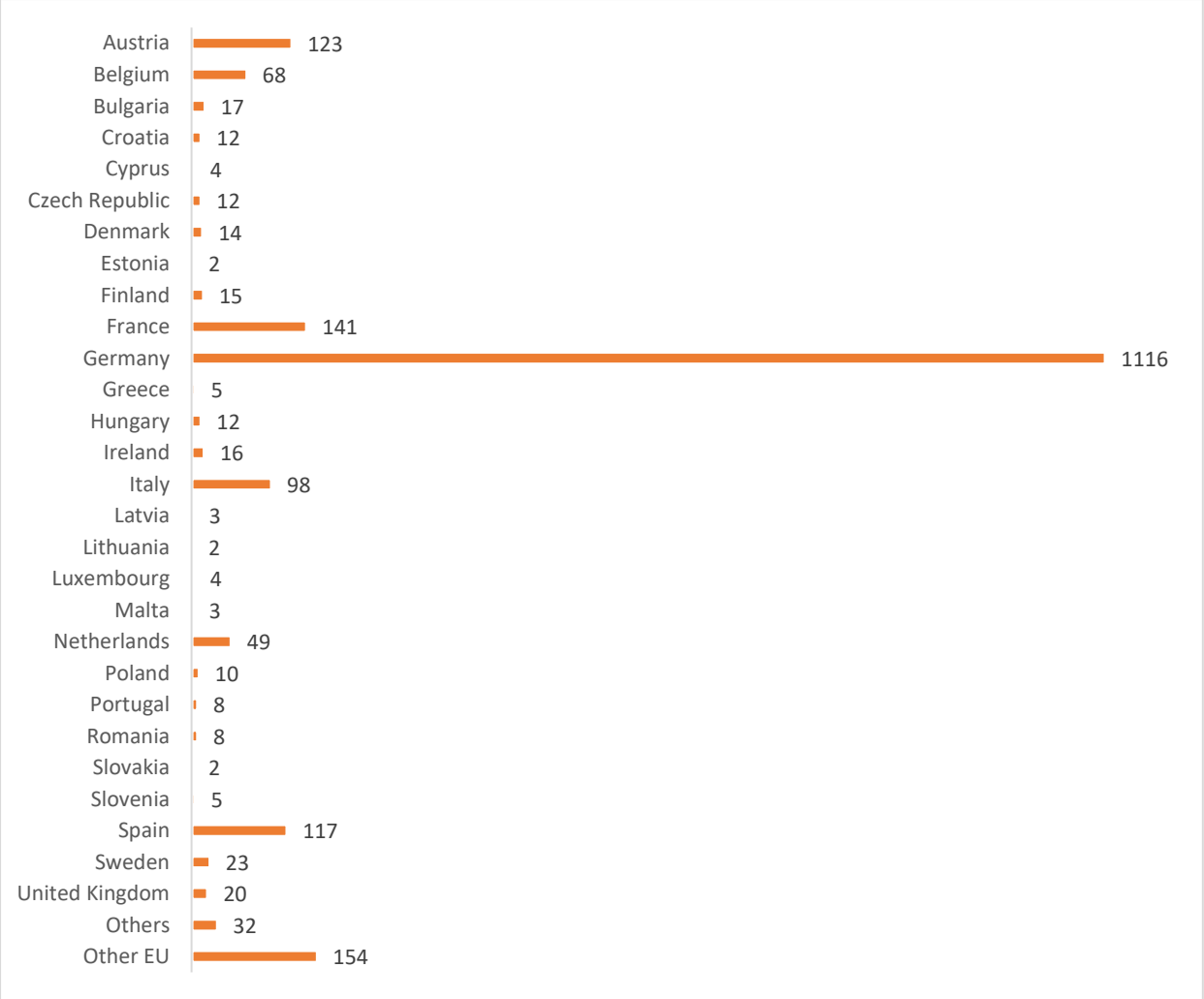
Non-campaign responses

As visible in the figure below, a substantial majority of respondents providing non-campaign responses (69%) were members of the public. This is to be expected for such an exercise, particularly considering there was a great deal of publicity around the consultation, with several organisations encouraging interested members of the public to respond.



Overview of response number per category of respondents

Respondents came from inside the EU and beyond. More than half were from Germany (1,116 respondents), followed by France, Austria and Spain. Non-EU respondents represented 2% (32) responses. A breakdown of respondents is presented in the 'Overview of respondents' country' figure below.



Overview of respondents' country

Position papers

As part of the consultation process, stakeholders were invited to submit additional information, including position papers. More than 100 separate submissions were received. Some documents were submitted multiple times by different stakeholders. Such position papers were logged and reviewed only once. In total, 90 unique position papers were submitted (see the list in the Appendix).

Targeted consultation

The targeted consultation took the form of an online survey, focus group workshops, stakeholder workshops, and interviews.

Targeted online survey

A targeted survey was held online from 1-29 March 2019. Expert stakeholders including Member States, international organisations, European Commission services, NGOs, industry representatives and academics were invited to provide views on a range of topics. The survey was split into 10 short questionnaires focusing on:

1. the Floods Directive
2. water body status: ecological, chemical and quantitative status
3. environmental objectives and exemptions
4. the Groundwater Directive
5. costs and benefits of the Directives
6. cost recovery and pricing
7. monitoring
8. public participation and opportunities for engagement
9. coherence of the legislation
10. EU added value.

The number of responses varied for each part of the survey. In total, 205 respondents took part. Several respondents also took the opportunity to submit useful supporting information and evidence.

Focus group workshops

A series of focus group workshops were organised by the project team. The aim of the gatherings was to explore in detail one specific topic, selected based on the need for additional information.

The following focus groups were held:

- Floods Directive — held following the Floods Working Group meeting (Lisbon, 28/29 March)
- Groundwater Directive (Brussels, 29 April)
- Costs and benefits — interactions organised in writing (questions sent to experts).

Ahead of each focus group workshop, participants received a short background document with a series of questions/points to explore as part of the discussions.

Participants were selected based on their expertise and involvement in the topics, also taking into account the geographical spread and occupation of participants.

Some of the key points discussed are summarised below (in addition, minutes of the meetings were prepared for sharing with participants and beyond).

Event	Key points discussed
Focus group workshop on Floods Directive	• It is still too early to know whether the Directive has been entirely successful as it is somewhat dependent on the occurrence of flood events to test the modelling and measures employed. • The Directive has positively contributed to coordination and development of a framework for managing flood risks. • The Directive has positively contributed to raising public awareness about flooding and flood risk management. • Two main indicators of success were identified: (i) implementing

Event	Key points discussed
	measures and (ii) risk reduction. The latter was considered difficult to measure. Furthermore, flood risk reduction is difficult to monitor due to factors such as climate change and increases in population in certain areas. • The flexibility and framework of the Directive have helped Member States to work together, communicate with the public and understand risk concepts.
Focus group workshop on Groundwater Directive	• It is up to date and many relevant scientific research streams were driven by the GWD. As a result, the knowledge of groundwater has increased immensely (both for groundwater quantitative and chemical status). • There are still significant scientific gaps for the implementation of the GWD, especially on aspects for protected areas (risk assessment for drinking water, groundwater-dependent terrestrial ecosystems and groundwater-associated aquatic ecosystems). For work targeted on ecosystems, these gaps are around understanding the sensitivities of terrestrial and aquatic ecosystems to groundwater quality and quantity. • Effects of climate change are difficult to model/predict. Climate change can be seen as an additional pressure. • Groundwater quantity is tackled in the WFD, not in the GWD. Issues with monitoring and quantitative status assessment need clarification, for instance on how to deal with karstic aquifers, on assessing risks for groundwater-dependent terrestrial ecosystems and on groundwater level and/or groundwater flow. • Overall, it is difficult to compare costs and benefits. However, there was a general view that the benefits were higher than the costs. • In some instances, costs have been reduced by the GWD as it reduced the burden in comparison to other legislation (e.g. in Denmark). Similarly, in the Netherlands, costs for monitoring for groundwater specifically have been reduced.

In addition, a specific expert workshop on pollutants of emerging concerns was held in coordination with the evaluation of the UWWTD. The key points discussed are listed below.

Event	Key points discussed
Expert workshop on pollutants of emerging concerns	While waste water treatment plants (WWTPs) are points of release of substances, they are not the origin of the pollution. As such, elimination and/or prevention at source of the pollution should also be considered as part of the analysis. Some of the substances have demonstrated impacts on the environment (e.g. diclofenac on aquatic species). However, there are also large data gaps. Several projects have been completed on sampling and removing specific substances (e.g. micro-plastics, pharmaceuticals) from waste water. There is no single treatment technique that can address all pollutants of emerging concern; costs of treatment vary by Member State and by size of the WWTPs. In addition, tackling substances individually is not an effective approach. Broad treatment approaches are better suited, as they also take mixtures into account.

Event	Key points discussed
	The needs for treatment vary according to the type of waste water generated. This can be influenced by demographics in agglomerations (e.g. more pharmaceutical products with older populations) but also by industries and their activities (i.e. more effluents produced during the week than the weekend). It is legitimate that the UWWTD does not adequately deal with pollution from pollutants of emerging concern because it was not designed with such pollution in mind.

Stakeholder workshops

A series of three workshops were organised to introduce the fitness check process in more detail to stakeholders, to present the findings to date and to gather feedback. The workshops had more than 120 participants, including representatives from Member State competent authorities, industry, NGOs, EU institutions, academia and international organisations. Their purpose was as set out below.

- Workshop 1 (10 October 2018, Brussels): An emphasis on process: it was important at the early stage for stakeholders to understand their opportunities for interacting with the project and the overall fitness check process.
- Workshop 2 (3 April 2019, Brussels): to present preliminary messages based on the analysis of the literature and the initial results from the public consultation. Emphasis was put on discussions, with opportunities for stakeholders to share their views on the messages being presented.
- Workshop 3 (3 June 2019, Brussels): Presentation of conclusions on the effectiveness, efficiency, relevance, coherence and EU added value of the Directives covered by the fitness check. The workshop offered live streaming in order to enable a large number of people to participate.

Ahead of each workshop, participants received a short background document summarising key points. As part of the workshops, participants were asked to provide their views on the information presented and additional thoughts and materials in relation to these topics.

All workshops were attended to full capacity, demonstrating the large interest from stakeholders.

Interviews

Interviews with selected stakeholders were organised in April and May 2019. A total of 74 individuals were approached for interviews. These included Member State competent authorities, International River Basin Districts, NGOs, industry representatives, research organisations and Commission services. Interviewees were selected in such a way as to address remaining gaps, in particular with regard to costs and benefits, transboundary cooperation and coherence of the legislation.

In addition, the Strategic Coordination Group of the common implementation strategy was approached and offered interviews. Following this, an additional 11 stakeholders requested an opportunity to be interviewed.

Feedback received on the evaluation roadmap

A total of 82 stakeholders provided feedback on the evaluation roadmap during the consultation period[377]. The opinions raised and evidence provided in this feedback were used in the study directly, with a number of the respondents providing further material as part of the other consultation activities undertaken. The key feedback is summarised in the table below, organised per evaluation criteria.

General comments on the fitness check:

- The public consultation should be well publicised and accompanied by clear background documents.
- The process should consider costs and benefits.
- The process should be transparent, taking the example of common implementation strategy processes.
- The focus is not only freshwater; the WFD also covers transitional, coastal and groundwater.
- The scope of the fitness check is broad and should focus on key issues: environmental targets, EQS, water management plans, the concept of non-deterioration, costs of water services, shrinking resources and high energy intensity.
- The scope does not mention the European citizen's initiative on the right to water[378], which should be included as a relevant source of information.

Efficiency

- Cost-effective measures: more guidance might be needed on cost-effective measures, as well as investigation on whether the WFD has encouraged the efficient use of measures.
- Polluter pays principle: the principle is not applied enough.
- Funding: it is unclear to which extent EU funding has supported the implementation of the Floods Directive.

Effectiveness

- Enforcement: better enforcement of the WFD is needed, including more infringement proceedings at EU level.
- Objectives: the goal of 2015 has not been met, so there is a need to re-evaluate objectives.
- Monitoring: monitoring of the WFD should be integrated with the monitoring of groundwater status and of quality of discharged waste water; it should also consider potential requirements in drinking water monitoring.

Coherence

- There is a need for more linkages between the WFD and other directives, in particular the Marine Strategy Framework Directive and the requirements of the former Shellfish Waters Directive.
- There is a need for better integration of climate change into the Directives through more encouragement of alternatives such as reuse (including raw waters reuse).
- The assessment should consider the Sustainable Development Goals.
- Internal coherence: there is no common definition or practices about 'sensitive areas' in Member States for the WFD. There is no definition for the 'frequent flooding' and 'extreme flooding' provisions in the FD.

Relevance

- Innovation: whether the Directives are sufficiently encouraging innovation.
- Energy efficiency: this should be better considered in the Directive, in particular linking to climate change mitigation.
- Assessment of chemical status using the 'one out all out' principle should be reviewed and considered if justified**.**

[377] https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-4989291/feedback_en?p_id=121146.
[378] http://ec.europa.eu/citizens-initiative/public/initiatives/successful/details/2012/000003.

Use of the information gathered

All of the information gathered as part of the data collection exercise, both through the consultation streams highlighted in this synopsis report, as well as literature review and collected evidence was processed by the team of consultants. This formed the basis for the examination against each evaluation question, noting relevant sources of evidence that are then quoted in the main body of the fitness check. Data were analysed to identify contradictory or supportive statements and evidence to reach the conclusions in the final evaluative study. The last stakeholder workshop was used to confirm the findings based on this information and to adjust as appropriate the conclusions according to stakeholders' views. All widely supported views were considered in the final report, with less widely supported views identified as such.

Appendix: Overview of position papers received

Author	Title
AGW	agw-Position anlässlich der „Öffentlichen Konsultation als Beitrag zur Eignungsprüfung der EUWasserrahmenrichtlinie und der damit verbundenen Richtlinien‘
AN FORAM UISCE The water forum	PUBLIC CONSULTATION TO INFORM THE FITNESS CHECK OF THE EU WATER FRAMEWORK DIRECTIVE
AöW	Wie weiter mit der Europäischen Wasserrahmenrichtlinie?
Arbeitsgemeinschaft der Wasserwerke im Einzugsgebiet der Elbe (AWE)	Position of AWE in the context of the consultation of the WFD
BAB	UK Farming Unions Response to the Public Consultation to inform the Fitness Check of the EU Water Framework Directive, its associated Directives and the Floods Directive
Bayerischen Bauernverbandes	Stellungnahme zur WFD und FD
BDI	BDI’s proposals for the review of the Water Framework Directive (WFD)
Businesseurope	Response to the public consultation on the WFD
CDP	CDP Europe’s comment on European Commission’s Fitness Check of the EU Water Framework Directive, its associated Directives (Groundwater Directive and Environmental Quality Standards Directive) and the Floods Directive
CEMR	Fitness check of the WFD and FD
CLEARANCE	Restoring riparian wetlands for clean water and agriculture — policy recommendations for the European Water Framework Directive, Fitness Check and review process, as well as the Common Agricultural Policy review process
Coldiretti	WFD remarks
COPA-COGECA	FITNESS-CHECK OF THE WATER FRAMEWORK DIRECTIVE (WFD)
CSOs in Spain	Contribution from CSOs in Spain to the WFD Fitness Check
Danish Environment Technology Associations	Position on the evaluation and fitness check of WFD
DBV	Stellungnahme zur offentlichen Konsultation zur Waaserrahmenrightlinie, damit verbundener Richtilinien sowie der Hochwasserrichtlinie
Deutscher Stadtetag	Überprüfung der EU-Wasserrahmenrichtlinie 2019
DIHK	DIHK-Stellungnahme
DVGW	POSITION PAPER Fitness Check of the EC Water Framework Directive
ECCR	Response to the Public Consultation WFD
ECPA	ECPA Position paper in the context of Public Consultation for the Fitness Check of the Water Framework Directive and the Floods Directive
ECSA	Answer to the public consultation WFD and FD
EDF	EDF’s Key messages on the ongoing WFD review

Author	Title
EFBW	Fitness check of WFD and FD
ENEL	ENEL VIEWS ON THE EU WATER FRAMEWORK POLICY
Euracoal	Position paper on WFD
EurAqua	Research and Innovation Needs for Enhanced WFD Implementation
EurEau	Post 2027 scenario: Realising the Water Framework Directive
Eurelectric	Water Framework Directive: Experiences & Recommendations from the Hydropower Sector
Eurochambres	Statement of the fitness check of the WFD and FD
EUROFER	EUROFER Position Paper on the Fitness Check Water Framework Directive and Daughter Directives for the Public Consultation
Euromines	Euromines position on the current evaluation of the Water Framework Directive (WFD)
European Water Association	EWA Position — Commitment to the Water Framework Directive — further development of the WFD while maintaining its objectives
EUWMA	EUWMA Frankfurt Declaration on Water Framework Directive
Finnish Energy	Response to the Public Consultation on the Water Framework Directive
Finnish Forest Industries	Response to the consultation on the WFD
Fortum	FITNESS CHECK OF THE EU WATER FRAMEWORK Fortum's views for the public consultation
Fortum Sverige	COMMENTS FROM FORTUM SVERIGE AB
German Association for Water, Wastewater and Waste / Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e. V. (DWA)	Review of the Water Framework Directive 2019
IAWR	Position of the International Association of Waterworks in the Rhine Basin (IAWR) concerning the Public Consultation to inform the Fitness Check of the EU Water Framework Directive and its associated Directives
ICOMIA	Contribution to the public consultation as part of the Fitness Check of the EU Water Framework Directive
IHK Nord (2018)	Expertise zu den wirtschaftlichen folgen der WRRL in NordDeutschland
Innogy	Public Consultation to inform the Fitness Check
Insurance Europe	Insurance Europe comments on the Fitness Check of the EU Floods Directive
IPO	IPO Position Paper — EU waterrichtlijnen
Irrigants d'Europe	WATER FRAMEWORK DIRECTIVE (WFD) — POSITION PAPER
KEMIRA	Evaluation of the UWWTD
Landbrug & Fødevarers	Erhvervsorganisationen Landbrug & Fødevarers indspil til WFD Fitness Check
LANTBRUKARNAS RIKSFÖRBUND FEDERATION OF SWEDISH FARMERS	Some views from the Federation of Swedish Farmers on the review of the Water Framework Directive
Living Rivers Europe	The EU Water Framework Directive. Fit for Purpose

Author	Title
MARS (2018)	MARS Recommendations on how to best assess and mitigate impacts of multiple stressors in aquatic ecosystems
MEDEF	Directive Cadre sur l'Eau — remarques et propositions du MEDEF
MEDEF	Water Framework Directive
Miljø- og Fødevareministeriet	Høringssvar i forbindelse med kvalitetskontrollen af EU's vandrammedirektiv, dets datterdirektiver (grundvandsdirektivet og direktiv om miljøkvalitetskrav) og oversvømmelsesdirektivet
NABU	Flussgebietsübergreifende Stellungnahme des NABU zu den Bewirtschaftungsplänen und den Maßnahmenprogrammen der Wasserrahmenrichtlinie (WRRL)
No author	Below we summarise our core messages
No author	Contribution à la consultation sur la révision de la DCE
No author	Zu den Zielen der WRRL
Norsk Industri	Position on the current fitness Check of the WFD
Norwegian Environment Agency	How we organised implementation in Norway, and lessons learnt from evaluation
ÖVGW	ÖVGW Position concerning EU Water Framework Directive
PAN Europe and PAN Germany	PAN Europe and PAN Germany position concerning the current review of the Water Framework Directive (WFD) and its Daughter Directives
Port of Antwerp	Position paper on WFD
Port of Rotterdam	Contribution to the public consultation as part of the Fitness Check of the EU Water Framework Directive
Royal Norwegian Ministry of Climate and Environment	Norwegian inputs to the Fitness Check of the WFD
RWE Group	Questionnaire statement
Seafish (2019)	Response to the Fitness Check of the EU Water legislation
Société Internationale de Biospéologie (SIBIOS) / International Society for Subterranean Biology (ISSB)	Review Process of WFD: Expert consultations Statement on Groundwater Ecosystems and Riverbed Colmation
Statkraft	Main challenges related to the Implementation of the Water Framework Directive (WFD) Statkraft's viewpoint
Stockholm University Baltic Sea Center	General views regarding the WFD
SWA	Key issues to address in the Water Framework Directive (WFD) to reach a sustainable water management — description and examples from the Swedish Water Alliance (SWA)
Swedenergy	Remarks on modernisation of the Water Framework Directive to efficiently balance local and global environmental needs
Swedish Association of Local Authorities and Region	Fitness check on the WFD

Author	Title
The Norwegian Biodiversity Network (Sabima), The Union of Outdoor Recreation Organisations in Norway, The Norwegian Hunters' and Anglers' Association, WWF Norway, The Norwegian Trekking Association and Friends of the Earth Norway	Input to the Fitness Check of the WFD
UKELA	Response to Fitness Check of the EU Water Legislation
Union Française de l'Electricité	Propositions du secteur hydroélectrique français pour la révision de la DCE
UNIPER	Position on the Fitness Check of the EU WFD
UPM	Fitness check of the WFD
VATTENFALL	Key messages on the Water Framework Directive (WFD)
VKU	ÜBERPRÜFUNG DER EUWASSERRAHMENRICHTLINIE 2019
Waste water Management in the Danube Region	Is the UWWTD implementation delivering results for the people, the economy and the environment?
Water UK	Fitness check of the Water Framework Directive and Floods Directive
Wattenfall and Fortum	Key messages on the WFD
Wetlands International	Feedback to the EU Fitness Check of the WFD
Wiener Wasser	Position Wiener Wasser
WKO	Position der Wirtschaftskammer Österreich REFIT Wasserrahmen-Richtlinie
Xylem	Xylem Position on Fitness Check on the WFD
Zentralverband der deutschen	Vorschlage zur Optimierung der Wasserrahmenrichtlinie
Zurich	Zurich Insurance Group — Response to public consultation on the fitness check of the EU Water Framework Directive and the Floods Directive (February 2019)

Annex 3 - Methods used in preparing the fitness check

This annex provides background to the steps taken and methods used in preparing the fitness check and the support study. It then sets out how the more detailed evaluation sub-questions addressed in the support study related to the overall evaluation questions. Finally, it summarises the limitations encountered in the process.

Methods and steps in the evaluative process

The process of the fitness check and the support study was divided into several distinct steps, including a comprehensive literature review, a consultation process, and finally the compilation and analysis of all evidence gathered.

Literature review

The first step in the analysis consisted in an extensive literature review. The different sources of information were identified and screened so that they could be categorised for targeted analysis. The sources included academic studies, implementation reports, position papers and evaluations/fitness checks/impact assessments. Additional sources included websites, EEA reports, JRC reports, Commission studies, independent studies, datasets, policy documents, common implementation strategy technical reports, infringement cases and project funding. The list of references quoted in this report can be found in Annex 4.

Public consultation

The second step of the process was the public consultation, which included:

1. an open public consultation through an online questionnaire, including expert consultation as part of the same exercise, using the Commission consultation's website;
2. targeted consultations, including:
    - a targeted online survey;
    - focus groups;
    - stakeholder workshops; and
    - interviews.

Feedback received on the evaluation roadmap was equally part of this step.

The details of the consultation process are described in Annex 2 (synopsis report of consultation activities).

Compilation of results

Following all evidence gathered, the results were analysed and compiled. An evaluation matrix was applied during the drafting of the support study: specific judgement criteria and indicators were used for each evaluation criterion (effectiveness, efficiency, coherence, relevance and EU added value).

Example of evaluation matrix — efficiency

Evaluation question		Judgement criteria	Indicators	Method	Sources[379]
EQ.4 – What are the costs and benefits of the legislation and to what extent are the costs of the legislation justified, given the benefits achieved?					
4.1	What are the costs incurred (monetary and non-monetary) since the adoption of the Directives in the Member States and in the EU, in particular since the last evaluation in 2012? How do these actual costs compare to those which were estimated in the Impact Assessments for the FD, GWD and the EQSD? What are the reasons for differences between foreseen and actual impacts? What are the benefits arising since the adoption of the Directives in the Member States and in the EU? How do these compare to those which were estimated in the Impact Assessments for the FD, GWD and the EQSD? What are the reasons for differences between foreseen and actual benefits?	Investments and other expenses (including non-monetary costs) have been incurred by Member States since 2012 in connection with adoption of the Directives. The relationship between estimated costs/benefits (as per impact assessments) with reported costs/benefits is a close one, with rational explanations available where differences are observed.	Amount of money (absolute and relative e.g. in relation to GDP per capita), as well as non-monetary costs from measures to implement the Directives. Direct benefits of improved wellbeing such as avoided health effects, avoided emissions to the environment, reduced contribution to climate change and direct financial/economic benefits. Ratio of reported costs to estimated costs.	Review of literature. Analysis of survey answers. Follow-up interviews. Focus groups. Workshops.	Evaluation of first RBMPs (2012). Blueprint to safeguard Europe's water resources (2012). Implementation reports: first in 2007, second in 2009, third in 2012, fourth in 2015. Evaluation of the UWWTD and Fitness Check of the chemical legislation. Impact Assessments of the Directives. Fitness Check of Water legislation (2011). "Flood risk management in the EU and the Floods Directives' first cycle of implementation (2009-2015) A questionnaire-based report". European Overview Assessment of Member States' reports on Preliminary Flood Risk Assessment and Identification of Areas of Potentially Significant Flood Risk. 2018 evaluation report to Parliament and Council based on Article 16 of the FD. European Court of Auditors – performance audit regarding floods.

[379] The list is not exhaustive. It presents the literature sources considered key to providing information for a specific sub-question. In addition to the sources mentioned here, use was made of the outcomes or intermediate results of relevant European research projects (under the 7th framework programme and Horizon 2020).

Evaluation questions analysed in the support study

The support study looked into the general evaluation questions, as well as the more specific ones set in the terms of reference for each evaluation criteria. The table below presents the mapping of the correspondence between the overall and the specific evaluation questions, which were the basis for the analysis of the study.

Overall evaluation questions	Evaluation sub-question
Effectiveness	
To what extent are the Directives performing as expected?	What progress have Member States made over time in implementing the WFD and achieving the objectives set out in the Directive?
	What progress have Member States made over time in implementing the EQSD and achieving the objectives set out in the Directive?
	What progress have Member States made over time in implementing the GWD and achieving the objectives set out in the Directive?
	What progress have Member States made over time in implementing the Floods Directive and achieving the objectives set out in the Directive?
	How have the Directives facilitated transboundary cooperation?
Which main factors have contributed to or stood in the way of achieving the Directives' objectives (including flexibility of the Directives)?	Which main factors have contributed to or stood in the way of achieving the Directives' objectives?
Have the Directives led to any unexpected significant changes, either positive or negative?	To what unexpected significant changes, either positive or negative, have the Directives led?
Efficiency	
What are the costs and benefits of the legislation and to what extent are the costs of the legislation justified, given the benefits achieved?	What are the costs incurred (monetary and non-monetary) since the adoption of the Directives in the Member States and globally in the EU?
	How do these actual costs compare to those estimated in the impact assessments for the FD, GWD and the EQSD? What are the reasons for differences between foreseen and actual impacts?
	What are the benefits arising since the adoption of the Directives in the Member States and globally in the EU? How do these compare to those estimated in the impact assessments for the FD, GWD and the EQSD? What are the reasons for differences between foreseen and actual benefits?
	Can any costs be identified that are out of proportion with the benefits achieved and vice versa? In particular, are the costs of compliance proportionate to the benefits brought by the Directives?
	Taking account of the objectives and costs/benefits of the Directives, is there evidence that they have caused unnecessary administrative burden to authorities or operators?
To what extent do the costs and benefits vary between Member States or regions?	If there are significant differences in costs or benefits between Member States and regions, what is causing them?

Overall evaluation questions	Evaluation sub-question
What factors have influenced efficiency, and can good practices be identified?	What factors have influenced efficiency (flexible legislation, CIS process clarifications and harmonisation on certain issues)? Can good practices be identified, particularly in terms of cost-efficient implementation of the Directives in Member States and regions?
To what extent are there opportunities to simplify the legislation or reduce unnecessary regulatory cost without undermining the objectives of the Directives?	Are there opportunities to simplify legislation or create synergies between the four Directives, thereby reducing regulatory cost without undermining the objectives of the Directives?
To what extent are monitoring and reporting requirements fit for purpose?	To what extent are monitoring and reporting requirements fit for purpose? How timely and efficient is the Directives' process for reporting and monitoring? Is it clear, flexible and simple enough to support timely decision-making?
Coherence	
To what extent is the legislation coherent internally?	Are the Directives coherent internally?
	Are the GWD and the EQSD coherent with the WFD?
	Are the WFD and daughter directives coherent with the Floods Directive?
To what extent is the legislation coherent with wider EU policy?	To what extent are the objectives specified by the Directives coherent with other pieces of EU legislation addressing the management of water resources?
	To what extent are the Directives satisfactorily integrated and coherent with other parts of EU environmental law/policy, including as regards environmental impact assessment, strategic environmental assessment and fundamental principles such as the polluter pays principle?
	To what extent do the WFD and FD complement or interact with other EU sectoral policies affecting land and water use/management at EU and Member State level. Policy areas covered are: agriculture and pesticides, nature, industry, chemicals (including biocides and cosmetics), regional development and cohesion, urban/land use, energy, transport and climate change.
To what extent is the legislation coherent with international obligations?	How coherent are the Directives with international and global commitments on water management and flood risk management (e.g. UN SDGs, UNECE, Paris Climate Agreement, Sendai Framework, OSPAR)?
Relevance	
How well adapted are the Directives to take into account technical and scientific progress? Have they been adapted based on this progress?	What has been the most significant technical and scientific progress in the areas covered by the Directives since they were designed. This relates in particular to better knowledge of the dynamics, or services, of aquatic ecosystems and new pressures (including climate change), recent knowledge related to risk assessment, and to the effectiveness of the applied measures. Which elements of this progress are relevant for the implementation of the Directives?
	How well adapted are the Directives to take into account technical and scientific progress?
To what extent are the objectives still relevant and properly addressing the	How relevant is EU water legislation to EU citizens and what is their level of support for it?

Overall evaluation questions	Evaluation sub-question
key problem that ecosystems and society presently face? This relates in particular to the adverse consequences of floods and the insufficient water status of (selected) water bodies in the EU, as needed for sustainable, balanced and equitable water use.	What are the key pressures threatening the good status of water bodies in the EU, how frequent and severe are the floods that ecosystems and the EU society currently face, and how have these pressures become stronger or weaker?
	What defines sustainable management of water resources in the EU, what is the need for it and how do the four Directives contribute to it?
	What are the needs of EU society in relation to the quantity of available water (water scarcity) and to what extent do the objectives of the Directives address these needs?
EU added value	
What is the additional value resulting from these Directives compared to what could have reasonably been expected from Member States acting at national, regional and/or international level?	What is the additional value resulting from these Directives compared to what could reasonably have been expected from Member States acting at national and/or regional level?
	What would have been the effect of non-implementation of the Directives and what are the costs/foregone benefits of only partial implementation of the Directives, if this is the case?
To what extent do the issues covered by the Directives still require action at EU level?	To what extent do the issues covered by the Directives still require action at EU level?

Conclusions on robustness of the evidence gathered

An individual assessment of the completeness of evidence was carried out for each evaluation question. The main difficulties encountered during the analysis were also identified.

- Given the different starting points for each Member State, it was challenging to distinguish the impacts actually observed from those that would have happened without the Directives. To address this, a baseline scenario was drawn up, adding quantitative and qualitative elements. The baseline was used as part of the analysis, while acknowledging the limitations imposed by such an approach.
- Constraints in the consultation: it was apparent from the materials received that some stakeholders based their answers on their subjective opinion without providing further explanations or data to support their statements. This increased uncertainty and the risk of misleading/biased answers.
- Triangulation was not possible for all questions owing to varying levels of evidence being available from different sources. Therefore, in some cases consultation responses and consultants' expert judgement had to be relied on to a larger extent than available literature and vice versa.
- Data on costs and benefits were largely missing and only 'case studies' could be presented in the analysis.

Despite the difficulties, the support study found that the evidence gathered provided a solid basis for the analysis. Any gap in the data available was signalled in the final report.

Annex 4 - References

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Annex 5 - Coherence - additional information on the coherence of water policy with wider EU policy

The information below complements the analysis in Section 5.3 on coherence.

For coherence with other EU water legislation, the annex includes additional information on the Marine Strategy Framework Directive and the Maritime Spatial Planning Directive.

For coherence with other environmental policies, it covers nature and biodiversity, the strategy for climate change and the green infrastructure strategy, chemicals, industrial emissions, air quality, waste and sewage sludge and soil protection.

Finally, for coherence with other EU policies, the annex includes complementary information on agriculture, transport (inland navigation), the Union Civil Protection Mechanism, fishing and aquaculture, and non-energy extractive industries.

Question 5.3.2: 'To what extent is the legislation coherent with wider EU policy?'

Coherence with other components of EU environmental legislation affecting water quality

Marine Strategy Framework Directive and Maritime Spatial Planning Directive

The similar quality elements used under the **MSFD** and the WFD include those for assessing pelagic and benthic biology, eutrophication, chemicals/contaminants and hydromorphology/hydrographical changes. The MSFD complements the WFD by also including additional quality elements on other aspects of environmental protection (including marine birds, mammals, fish and reptile species, and additional pressures such as litter and underwater noise). Apart from the specific links established in Decision (EU) 2017/848 for descriptors 5 and 8 (eutrophication and concentration of contaminants), the relationship between WFD assessments in coastal waters (as expressed in MSFD Article 3(1)(b)) and MSFD assessments needs further clarity to ensure complementarity. As regards the issue of WFD EQS not being appropriate for marine waters, in principle there is no barrier to harmonisation with the MSFD as the WFD generally includes different water EQS values for coastal and transitional waters (cf. inland surface waters). However, the issue of whether to use food standards as the basis for biota EQS is more complicated. Further work would help to achieve better coordination.

In addition to using some different criteria, the assessments operate on different scales: water bodies are assessed under the WFD, while marine regions or subregions are assessed under the MSFD. Consequently, even when the methods and indicators are similar, there can be differences between the final assessments of the same area because of the different spatial aggregation of the results.

The Maritime Spatial Planning Directive (MSPD)[380] also applies to Member States' coastal waters (Article 2.1), including their seabed and subsoil (Article 3(4)). These waters include coastal waters "as defined in point 7 of Article 2 of Directive 2000/60/EC and their seabed

[380] Directive 2014/89/EU.

and their subsoil (Article 3(4))". There are therefore possible interactions between the WFD and the MSPD. At the stakeholder workshop of 3 June 2019 some stakeholders raised this issue, for example in relation with shellfish aquaculture.

The MSPD is intended to contribute to achieving the aims of the WFD and MSFD, and there are clear interactions between them. However, there has been no detailed analysis at EU level of how the Member States' Maritime Spatial Plans and RBMPs link together.

Coherence with other EU policies addressing the protection of the environment

Nature and biodiversity

The EU has a number of policies aimed at protecting biodiversity that interact with the WFD and FD. These are, in particular, the Nature Directives, the biodiversity policy, the Invasive Alien Species Regulation and the Eel Regulation.

The objectives of the Nature Directives and WFD are coherent with one another as they all aim to achieve healthy ecosystems. There are differences in terminology used in the Directives, which reflect their different focus: the WFD aims to achieve 'good status', while the Nature Directives aim to achieve 'favourable conservation status' for the habitats and species they seek to protect. The WFD requires that the objectives of the Nature Directives be fully taken into account in river basin planning and that other water management decisions be fully consistent with objectives for protected areas so that effective water management can contribute to the objectives of EU biodiversity policy. The WFD also requires the establishment of a register of all protected areas designated under EU law to protect freshwater or species and habitats dependent on water in each river basin district, as well as the inclusion of such areas in water monitoring programmes. The WFD and the Nature Directives are complementary in the sense that the Nature Directives set specific protection objectives for certain species and habitats, while the WFD sets more general objectives to ensure protection and restoration of healthy ecosystems which benefit all species. An example of successful complementarity was reported in the scientific literature for seagrass conservation in Europe, which found that both the WFD and the Habitats Directive have contributed in a complementary way to reversing seagrass population decline[381]. The legal coherence is therefore clear, although interaction on the ground needs interpreting on a case-by-case basis by the Member States.

The EU biodiversity strategy is a crucial instrument to secure and sustain the natural resource base our economy needs to thrive. It is also designed to deliver on the EU international commitments under the Convention on Biological Diversity and is strictly linked to the policy objectives of a number of EU legislative acts, including the WFD. Achieving the WFD policy objectives will also contribute to achieving the biodiversity strategy target, while vice versa the strategy frames the protection of freshwater ecosystems in the broader EU biodiversity protection context.

Two targets of the biodiversity strategy are particularly relevant to the objectives of the WFD:

- Target 1 - Halt the deterioration in the status of all species and habitats covered by EU nature legislation and achieve a significant and measurable improvement in their status by 2020 compared to current assessments.

[381] De los Santos et al (2019).

- Target 2 - By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems.

Freshwater ecosystems (open water and wetlands) cover only less than 5% of the area of the EU-28 but hold a higher number of species per unit area than land or sea, and provide a number of key ecosystem services. They are thus key for the achievement of this target.

The WFD is also entirely compatible with the **Invasive Alien Species Regulation**[382], which sets out to protect native biodiversity from invasive alien species, and the WFD and the IAS Regulation support each other. The presence of alien aquatic fauna or flora in a water body can severely affect biological quality elements, as well as physico-chemical elements or hydrology of a water body. Compliance with the IAS Regulation can therefore support the achievement of good ecological status in water bodies. Conversely, water bodies in good ecological status are resilient and healthy ecosystems able to support rich biodiversity, making such ecosystems better able to withstand the presence of alien species and less prone to invasion.

Strategy for climate change and the green infrastructure strategy

Floods and droughts have already affected large parts of the EU and have a significant impact on socioeconomic developments. In the future, climate change will probably increase both the number and magnitude of these hydrological extremes[383].

The WFD and daughter directives do not explicitly address the relationship between climate change and RBMPs, although all qualitative and quantitative water aspects referred in the Directive will be affected by climatic change. That said, Annex II to the Directive refers to the need to identify 'significant pressures' affecting water bodies and provides a framework for incorporating the impacts of climate change in the water planning process. In addition, the cyclical approach of the Directive makes it possible to incorporate scientific and technical progress. Given that climate change will certainly aggravate future anthropogenic pressures, expected impacts should therefore be considered within the framework of the Directive. Guidance Document No 24 provides more direct support for incorporating climate change projections into the second and third planning cycles and more specifically into the assessment of pressures and impacts, monitoring and establishment of measures. Based on that guidance document, Member States agreed that from the second planning cycle onwards climate-related threats and adaptation planning should be incorporated in their RBMPs. Climate change was mentioned as being linked to the WFD in nearly all river basin districts in various ways. Climate change has been considered when setting objectives, when selecting robust adaptation measures, when monitoring change at reference sites and when assessing direct and indirect climate pressures.

Climate change is also considered in the context of drought management and water scarcity. 32% of Member States have adopted supplementary measures related to climate change adaptation in their RBMPs. Member States' work is sometimes linked to national strategies on climate change adaptation under the EU climate change adaptation strategy[384].

[382] Regulation (EU) 1143/2014.
[383] EEA Report No 1/2017.
[384] https://ec.europa.eu/clima/policies/adaptation/what_en

The Floods Directive makes no reference to the EU's green infrastructure strategy, nor to the EU adaptation strategy[385]. However, climate change is considered in flood risk management, and both strategies are continuously promoted in the Commission's work with the Member States. Encouragingly, the information compiled from the Member States indicates that all 26 Member States assessed included nature-based solutions or a subset of these (i.e. natural water retention measures), in some or all of their FRMPs[386].

Chemicals

This analysis only focuses on the legislation considered as most relevant for the WFD, EQSD and GWD.

Regarding the authorisation process, the REACH Regulation is a central piece of legislation as it establishes procedures for collecting and assessing information on the properties and hazards of substances. Companies are responsible for evaluating and managing the risk associated with the substances they manufacture and market, and are required to register them at EU level. The substances then need to be evaluated by the European Chemicals Agency and Member State authorities, which can decide to ban them if the risk is considered unmanageable. This process is linked to the WFD and EQSD as the risk analysis should take into account the monitoring results of the WFD, as required by the EQSD. Conversely, the identification of substances to be included in the WFD and EQSD lists takes into account the identification process under REACH, therefore the identification of substances should be coherent between the two policies. There is, however, evidence showing that the use of REACH data for the WFD is limited by the fact that data on REACH data are structured in a format which makes their use for environmental considerations less easily applicable.

The Pollutant Release and Transfer Register Regulation (Regulation No 166/2006) requires operators to report emissions of pollutants exceeding a specific threshold (i.e. only from large installations) in a European Pollutant Register, providing access to information on pollution. Under the WFD, an inventory of emissions should cover all losses, emissions and discharges of priority substances, and therefore the values in the inventory are expected to complement and be higher than the E-PRTR data for the same substances. The information is, however, difficult to compare as different sources are considered, and as there are weaknesses in the way Member States have reported the emissions under the WFD[387].

The Industrial Emissions Directive (2010/75/EU) (IED) plays a very important role in the control of point source emissions to surface water. The coherence with the IED is analysed in the next sub-section.

The Sustainable Use of Pesticides and the Plant Protection Regulation regulate the use of pesticides in agriculture.

The Plant Protection Products Regulation regulates the authorisation of active substances and co-formulants of those products, and their use. A substance's impact on the aquatic environment should be considered during authorisation, as should the availability of alternatives. Alternatives, however, are often lacking. On the application of products,

[385] Both strategies were adopted in 2013, after the introduction of the FD.
[386] Climate change is discussed under 'Relevance'.
[387] EEA Report No 18/2018.

according to Article 67, producers have the obligation 'to undertake post-authorisation monitoring on the request of the competent authorities'. However, feedback on implementation shows that such monitoring is rarely performed and that Member States do not have sufficient resources to check that products are being applied correctly.

The implications of designating a substance as persistent, bioaccumulative and toxic (PBT) or very persistent, very bioaccumulative (vPvB) vary widely under the different pieces of chemicals legislation: such substances are not approved at all under the Plant Protection Products Regulation, whereas under other legislation the final decision depends on the conclusions of a socioeconomic analysis. Under the WFD, this means that a PBT or vPvB might not necessarily be designated as a priority hazardous substance if it would not be socioeconomically realistic or appropriate to expect emissions to the aquatic environment to be phased out completely.

The Sustainable Use Directive (Directive 2009/128/EC[388]) (SUD) sets out to achieve sustainable pesticide use practices by reducing the risks from pesticide use to human health and the environment. It does this by requiring the establishment of national action plans setting quantitative objectives, targets, measures, timetables and indicators to reduce risks and impacts of pesticide use in Member States. In May 2019, an amendment to the SUD (Commission Directive (EU) 2019/782) established harmonised risk indicators to help meet objectives under the SUD at EU level and to enable Member States to manage and report risk[389].

Articles 4(1) and 11(2) of the SUD oblige the Member States to take suitable measures to protect surface and ground waters, as well as drinking water supplies, against the negative impacts of plant protection products. Article 11 also requires the measures in the national action plans to be compatible with WFD requirements. In particular, measures to protect the aquatic environment should refer to, and be compatible with, relevant provisions on priority hazardous substances in Article 16(3) of the WFD, clearly linking the chemical aspects of the directives in question. The SUD has been recognised as providing a useful contribution to fulfilling the objectives of good water status under the WFD.

The above-mentioned Directive (EU) 2019/782 amending the SUD furthers the Commission's ambition for harmonised risk indicators to act as incentives for both Member States and individual users to switch to low-risk active substances and non-chemical methods, in a bid to help fully achieve the goals of the SUD. Furthermore, integrated pest management, which is a cornerstone of the SUD (Article 14), and a requirement for Member States, aims to achieve the lowest possible use target for pesticide application by promoting an integrated approach to the use of alternatives to pesticides in pest management.

However, an evaluation of the first national action plans conducted by the Commission in 2017[390] shows that, even though integrated pest management is a key aspect of how the plans tackle pesticide pollution, it is implemented at different levels across Member States. The evaluation shows in particular that Member States had not converted integrated pest management principles into prescriptive and assessable criteria, and had no measures in place

[388] Directive 2009/128/EC.
[389] Directive 2019/782/ EU.
[390] Report from the Commission to the European Parliament and the Council on Member State National Action Plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides. 2017 https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_sup_report-overview_en.pdf

to assess compliance. Twenty-seven national action plans cover the protection of the aquatic environment against plant protection products, but in the absence of measurable targets in most cases, the report states that it is difficult to observe and quantify progress.

In essence, the legislation is coherent with the WFD, and its proper implementation should contribute to achieving the WFD's objectives. However, the assessment of national action plans points to weaknesses in the implementation of integrated pest management and to the lack of a robust strategy to reduce the use of pesticides, which compromises the effectiveness of this instrument to reduce water pollution. The European Court of Auditors is drafting a report on action taken at EU level to ensure sustainable use of plant protection products; the report will is expected to include observations on the SUD and the national action plans.

The Biocidal Products Regulation requires the registration at Member State level of 'active' substances of products. This includes consideration of toxicological effects, efficacy and effects on non-target species. The legislation allows Member States to restrict or ban the use of products in the water supply system or to target biocides for substitution in case of potential groundwater contamination. It also requires Member States to report measures adopted against contamination of surface water and groundwater. As the Regulation is intended to promote prevention of the use of substances in connection with their risk to water, it allows for close links with the WFD and EQSD. The integrated assessment of the second RBMPs[391], however, shows that the objectives and data structure for biocides are very different from the needs of the WFD and are consequently considered as less useful. Some contributors to the consultation commented that there was a very limited overlap between priority substances and biocides, which made the topic less relevant for their planning. However, some biocides are listed as priority substances.

The Persistent Organic Pollutants (POP) Regulation transposes the Stockholm Convention at EU level. The Regulation regulates the production, placing on the market, exportation and use of chemicals, management of stockpiles and wastes, and requires measures to reduce unintentional releases of persistent organic pollutants. Persistent organic pollutants pose a significant risk for the environment as they accumulate for a long time, making the Regulation of particular relevance for the achievement of the EQSD's objectives. The Regulation is also particularly relevant when such substances are transported over long distances and it addresses problems associated with substances coming from outside the EU that may contribute to the pollution of EU waters and vice versa.

The Detergents Regulation provides key measures to reduce the environmental impact of detergents. It deals in particular with the concept of biodegradability, and legislates on the content of phosphates and other phosphorus compounds in products. The latest requirements were introduced in 2012 in order to reduce the damage caused by phosphates from detergents on the aquatic environment due to eutrophication. A 2019 evaluation of the Detergents Regulation shows that it has been effective (to a certain extent) in reducing the amount of phosphorus/phosphates used in consumer laundry and dishwashing detergents. While this requirement contributes to meeting the objectives of the WFD, the evaluation did not provide a precise assessment of the Regulation's contribution to reducing eutrophication because of a

[391] Acteon and Wood (2019).

lack of data and the difficulty in isolating the effects of detergents among the whole range of other pressures.

EU water law has the potential to address pollution from pharmaceutical substances. Indeed, some pharmaceuticals have been included in the watch list under the EQS. Pharmaceuticals in the environment and anti-microbial resistance are inter-related issues that have become more pronounced in the environment. An increased volume and diversity of pharmaceuticals are now found in water and soil all over Europe, having an impact on the environment and warranting vigilance as regards their impact on human health. To address the problem, the European Commission adopted the One Health Action Plan on anti-microbial resistance in 2017 and a strategic approach on pharmaceuticals in the environment in 2019. The aim is to use opportunities offered by legislative and non-legislative tools at European, national and sectoral levels. So far, the current water, industry and health-related legislation gives an indication of how the issues of pharmaceuticals in the environment and anti-microbial resistance might be tackled.

Mercury is one of the substances involved in the largest number of failures to meet good chemical status in surface water bodies[392]. Out of some 111,000 European surface water bodies identified in an EEA study (2018[393]), more than 45,000, across 24 Member States, are failing to reach good chemical status due to mercury pollution. A new EU Mercury Regulation[394], applicable since 1 January 2018, seeks to limit further mercury use and emissions by regulating trade in mercury and mercury compounds and by improving the management of mercury waste. It covers the full life cycle of mercury and complements a large body of existing EU environmental law on mercury.

Thanks to this long-standing EU mercury policy, a 73% reduction of mercury emissions to air was achieved between 1990 and 2014. The EU now accounts for less than 3% of global mercury emissions to air. Furthermore, emissions to water were reduced by 71% between 2007 and 2014[395]. However, both atmospheric deposition and point source pollution are drivers for the bad chemical status of European surface waters. Although a decrease can be seen in mercury releases to water from industry, urban waste water treatment plants are still named as one of the biggest sources for mercury pollution.

At global level, the Minamata Convention, which entered into force in 2017, aims to protect human health and the environment against anthropogenic emissions and releases of mercury and mercury compounds. The Convention promises to curb and eventually eliminate the global increase in mercury emissions.

[392] 2019, Report from the Commission to the European Parliament and the Council on the implementation of the Water Framework Directive (2000/60/EC) and the Floods Directive (2007/60/EC) Second River Basin Management Plans and First Flood Risk Management Plans (https://eur-lex.europa.eu/resource.html?uri=cellar:bee2c9d9-39d2-11e9-8d04-01aa75ed71a1.0005.02/DOC_1&format=PDF).

[393] EEA Report No 18/2018.

[394] Regulation No 852/2017/EU.

[395] EU Rules on Mercury in Action: Reducing use and emissions of mercury (http://ec.europa.eu/environment/chemicals/mercury/pdf/ENV-17-011-IndustrialEmissionsFactsheet-MERCURY-E-web.pdf).

It is too soon to evaluate the impact of the new Mercury Regulation and the Minamata Convention, but it is very likely that they will contribute to reducing pressure from mercury emissions to water.

Understanding spatial and temporal mercury trends is crucial in assessing measures taken both at European and global level. European waters still suffer extensively from mercury pollution. It is only by understanding the movement and interaction of mercury within our environment that this persistent problem will be tackled.

The food standards legislation on residues standards in fish sets standards in terms of the maximum amount of substances in commercialised fish. There have been debates on the links between the boundaries set by the EQSD for human health and the boundaries set by the food legislation, which can be different. The technical guidance recently published for the EQSD has addressed this issue.

Industrial Emissions Directive

The Industrial Emissions Directive (IED) covers industrial installations of a minimum size in a broad range of sectors, including power plants, chemical installations, waste incinerators, pig farms and poultry farms. Small sites falling below IED requirements are not covered. The Directive requires installations to operate with a permit which sets emission limit values for pollutant emissions to air, water and soil. The emission limit values must be based on 'best available techniques' (BATs) set at EU level. The IED and the WFD both include provisions requiring them to be mutually coherent. Indeed, Article 10(2) of the WFD requires compliance with the IED and Article 10(3) requires stricter permit conditions to be set if necessary to achieve compliance with a quality objective or quality standard. A similar requirement exists in Article 18 of the IED. Assessment of the second RBMPs shows that most programmes of measures mention regulatory permitting of emissions as a key measure for chemical status.

Also noteworthy in this area is the recent Commission decision under the IED (Decision (EU) 2017/302) establishing maximum nitrogen emission levels for poultry and pig producers and laying down techniques for reducing emissions of nitrogen to soil and water resulting from manure spreading. These requirements should contribute to reducing nutrient pollution by agriculture, which has been identified as a major pressure for good water status under the WFD. The results of consultations and previous work[396] show that full coherence has not been reached for some aspects and/or in some areas. Concerns have been raised in particular that the process for adopting BAT reference documents (BREFs) and corresponding emission levels under the IED does not sufficiently address releases of priority substances into water. Furthermore, the relationship between the objectives of the EQSD and the emission levels set under the IED is not sufficiently well addressed, particularly on the role of mixing zones and on how to address cumulated and indirect releases. Some consultation respondents also highlighted inconsistency between the general obligation of the WFD to cease and phase out emissions of priority hazardous substances and the existence of maximum concentrations or emission levels for the same substances under the EQSD and the IED. During the consultation some stakeholders also expressed their concern about the fact that the Best Available Technique reference documents insufficiently cover the issue of industrial water

[396] In particular the joint workshop organised by European Commission (DG Environment) and the German Ministry for the Environment. 27-28 November 2017, Berlin, Germany.

efficiency. It has been agreed at EU level that further work on these issues is needed, possibly in the form of exchanges of good practices, worked examples and/or guidance[397].

Air quality

The EU clean air policy framework sets standards for air quality in the Ambient Air Quality Directive (2008/50/EC) and in Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. The EU has also set national emission reduction commitments in the National Emission Ceilings Directive 2016/2284/EU. This policy is linked with the WFD in two main respects: first, atmospheric deposition of chemicals and of nitrogen is identified as one of the pressures affecting water (cf. assessment of the second RBMPs); second, measures put in place to reach the objectives of both Directives are closely linked. Feedback from the consultation shows that there is a lack of clear guidance on how to deal with atmospheric deposition to water, especially as the links between the standards in air and water are not clearly established.

There are synergies on eutrophication: the National Emission Ceilings Directive includes reduction commitments for nitrogen oxides and ammonia emissions, as well as mandatory and optional measures for reducing ammonia emissions from agriculture (National Emission Ceilings Directive, Annex III). This contributes to reducing eutrophication in water. There is also ongoing work under the same directive to monitor impacts from air pollution on ecosystems, including the use of eutrophication indicators and the link to nitrogen deposition/pollution. Member States must put in place a monitoring network to analyse the impacts from air pollution on a representative selection of their ecosystems; the first data were due by 1 July 2019. If Member States do not take all environmental objectives into account in an integrated manner, there can be a risk of negative effects e.g. when measures to reduce ammonia emissions lead to nitrate pollution in water or vice versa (i.e. shifting pollution instead of reducing it). To support the agricultural community and Member States to avoid such effects, the European Commission and the UNECE Air Convention (CLRTAP) are developing a guidance document on integrated sustainable nitrogen management, taking into account nitrogen pollution into air, water and soil in a complete and comprehensive manner.

Waste and sewage sludge

Sewage sludge originates from the process of treatment of waste water and can be used in agriculture; it is rich in nutrients such as nitrogen and phosphorous and contains valuable organic matter that is useful when soils are depleted or subject to erosion. However, sewage sludge can also contain substances such as metals, industrial organic compounds or pharmaceuticals, as well as particulate matter such as micro-plastics, that can be released into water and be a source of contamination. The Sewage Sludge Directive (86/278/EEC[398]) seeks to encourage the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects on soil, vegetation, animals and humans. Although the Directive focuses on protecting soil and agricultural products, it also states that sludge application should not endanger surface or groundwaters. The higher the level of treatment under the UWWTD, the more likely the sludge is to be polluted, including by a wide range of

[397] Report of the joint workshop organised by DG ENV and the German Ministry for the Environment, Berlin, 27-28 November 2017 https://circabc.europa.eu/ui/group/06f33a94-9829-4eee-b187-21bb783a0fbf/library/56767bcd-4958-4e36-9b24-3690fd2723c2/details

[398] Directive 86/278/EEC.

micropollutants (including micro-plastics). This highlights the value and efficiency of reducing pollution at source, as promoted by the WFD.

The Sewage Sludge Directive sets limit values for the concentrations of seven heavy metals in sludge and soils, and imposes certain monitoring obligations. The focus on metals that could run off into surface waters or leach into groundwater is useful from the perspective of the Water Directives, especially given that metals have been identified as one of the key groups affecting good status. However, some Member States have over recent years set stricter requirements, including for additional substances, or banned the use of (certain types of) sludge for certain purposes or in certain areas[399], thus going beyond EU-level restrictions[400]. One of the issues triggering this action is concern about contamination with organic pollutants such as PFOS[401]. Sewage sludge use must also take account of the risk of causing eutrophication.

A 2010 study on the environmental, economic and social impacts of the use of sewage sludge on land shows that 'most Member States have adopted stricter standards and management practices than those specified in the Directive, either through binding rules or via codes of practice and other voluntary agreements[402]'.

Article 8 of the Sewage Sludge Directive also specifies that 'the sludge shall be used in such a way that account is taken of the nutrient needs of the plants and that the quality of the soil and of the surface and ground water is not impaired'. In addition, Member States have to follow rules stemming from other legislation related to water when using sewage sludge. The Nitrates Directive requires balanced fertilisation and therefore encompasses all sources of nitrogen into agricultural land, including sewage sludge which falls within the definition of fertilisers. Therefore, the rules outlined in the Directive to reduce water pollution should also apply to the spreading of sewage sludge. Furthermore, Member States' efforts to meet the requirements of the Nitrates Directives may restrict the use of sludge on land in local areas.

In the available studies carried out in the context of the potential revision of the Sewage Sludge Directive in 2010, the environmental impact of sewage sludge on water and groundwater was not/could not be quantified as it was highly uncertain[403]. The studies also state that 'much of the literature and many responses to the first consultation indicate that the current levels adequately protect environment and human health'.

The Waste Framework Directive (2008/98/EC) sets out the basic concepts and definitions in the area of waste management, and states that waste should be managed without endangering human health and harming the environment, and in particular without risk to water. In addition to this framework, specific legislative acts aim to regulate specific aspects of waste management.

[399] German 'Verordnung über die Verwertung von Klärschlamm, Klärschlammgemisch und Klärschlammkompost'; https://www.gesetze-im-internet.de/abfkl_rv_2017/index.html including https://www.gesetze-im-internet.de/abfkl_rv_2017/__15.html.
[400] https://ec.europa.eu/environment/waste/sludge/index.htm
[401] https://www.lubw.baden-wuerttemberg.de/-/landesweit-pfc-eintrage-durch-kompost-und-klarschlamm-untersucht.
[402] Environmental, economic and social impacts of the use of sewage sludge on land — Part II. 2010. http://ec.europa.eu/environment/archives/waste/sludge/pdf/part_i_report.pdf
[403] Part II of the study (pp. 6-7) http://ec.europa.eu/environment/archives/waste/sludge/pdf/part_ii_report.pdf.

Landfill of waste can potentially lead to water pollution due to leachate that escapes from the landfill[404]. Landfills can continue to produce leachate for several hundred years after they have ceased to operate. A 2010 study on 'Economic Valuation of Environmental Externalities from Landfill Disposal and Incineration of Waste' shows that 'very few attempts have been made to quantify and valuate soil and water externalities from landfills' as 'pollution pathways of emissions to soil and water are quite site specific and difficult to measure[405]'. Directive 1999/31/EC sets requirements on the landfill of waste, which aim to prevent or reduce as far as possible negative effects from the landfilling of waste on the environment, in particular on surface water, groundwater, soil, air, and on human health. Section 3 of Annex 3 to the Directive sets requirements and sampling frequencies for monitoring surface water, leachate, gas emissions and atmospheric pressure, while Section 2 of Annex I lays down the general requirements for water control and leachate management. The implementation report for the Directive covering the period 2013-2015 shows that all Member States declared that they have in place provisions for the required monitoring and have undertaken technical measures to ensure that the requirements of Annex I on water control and leachate management are in place. The most common measures were drainage systems to collect surface and groundwater, the collection and treatment of leachate, and cover and vertical sealing structures. A revised legislative proposal included in the circular economy package was adopted in 2014 and sets new targets to reduce landfilling. These will further limit the impact on water of improper waste disposal.

For the management of biowaste, the requirements on the separate collection of biowaste laid down in Article 22 of Directive 2008/98 demand a high level of environmental protection, which will lead to higher quality compost and digestate and thus prevent risks of water contamination.

Soil protection

Soils are key to the delivery of a wide array of ecosystem services, including water and nutrient cycle regulation, water purification, food and fibre production, providing a physical basis for construction and habitat for various species. Soil can also accumulate contaminants and transfer them to water, while soil erosion can alter aquatic ecosystems. Protecting soil ecosystems, preventing erosion and pollution of soil is therefore essential for water protection.

Water protection policies are playing an important role in protecting Europe's soils. Nonetheless, there is no specific requirement in water quality legislation (e.g. in the WFD) to remediate or protect soils *in situ*. Instead, the goal of water legislation is to prevent negative impacts on water bodies; this could be delivered in multiple ways, including reducing diffuse pollution or hydromorphological changes due to soil erosion.

To identify significant anthropogenic pressures that affect water bodies, the WFD requires Member States to collect relevant information such as the estimation of land use patterns. More specifically, Article 5 of the Directive requires soil protection aspects and the possible impact of soil degradation as a pressure on water quality to be taken into account in the

[404] http://ec.europa.eu/environment/integration/research/newsalert/pdf/volume_leachate_environmental_impact_landfills_reduced_legacy_effects_remain_483na3_en.pdf

[405] European Commission, DG Environment. A Study on the Economic Valuation of Environmental Externalities from Landfill Disposal and Incineration of Waste Final Main Report, October 2000 http://ec.europa.eu/environment/waste/studies/pdf/econ_eva_landfill_report.pdf

characterisation of river basin districts. For the WFD, Member States report on diffuse pollution from agriculture or from forestry, part of which may be due to soil erosion. They can also report on hydromorphological changes, which may in some cases also be due to soil erosion.

To achieve the WFD's objectives, Member States need to draw up and implement the necessary measures. Among these are demand management and coordination with other plans and programmes, including land management and soil protection action aimed at reducing the risk of desertification. For more on this issue, see the European Court of Auditors' report on desertification[406]. Measures to reduce sediment[407] from soil erosion and surface run-off are also included in the second RBMPs and have been reported for 34 RBDs.

There is no comprehensive legislation on soil contamination at EU level due to the Commission's withdrawal in 2014 of the proposal for a Soil Framework Directive. However, the soil thematic strategy (COM (2006) 231) provides a set of overarching principles on soil protection at EU level, while the Environmental Liability Directive obliges polluters to remediate water and land damages caused by activities that took place after the entry of force of the Directive (30 April 2004).

Coherence with other EU policies

Agriculture

Cross-compliance is a link at farmer level between common agricultural policy (CAP) payments and compliance with rules, in particular for water policy, stemming from EU legislation. Farmers not complying with these rules may incur reductions of their CAP payments. In that respect, cross-compliance has improved awareness among farmers of environmental concerns. However, its impact has been limited by its not having sufficiently integrated the WFD objectives. The cross-compliance scheme has, since its adoption, included rules relevant for the protection of water, such as rules under the Nitrates Directive, the Groundwater Directive and a number of standards for good agricultural and environmental condition of land such as buffer strips or rules for the use of water for irrigation. Six cross-compliance requirements have a direct impact on water quality and water quantity, while several other cross-compliance requirements have an indirect impact on water protection[408]. Subsequent reforms of the CAP have progressively included more requirements on water protection, and the Commission now proposes the introduction of several requirements under the WFD in line with the 2013 'joint statement by the European Parliament and the Council on cross-compliance' requesting such action[409]. An audit from the European Court of Auditors in 2014 showed in particular that some important water-related issues have not been included in cross-compliance. The issues mentioned are requirements for farmers to limit the use of phosphorus on their land and to limit the application of pesticides in the immediate vicinity of water bodies. This report also concluded

[406] https://www.eca.europa.eu/en/Pages/DocItem.aspx?did=48393

[407] Dredging is considered in certain areas of the EU and elsewhere as a tool for flood control. The FRMPs in seven Member States include measures for dredging of rivers to increase river channel capacity and its ability to convey water for flood alleviation purposes.

[408] European Court of Auditors Special Report No 4/2014.

[409] Joint statement by the European Parliament and the Council on cross-compliance attached to Regulation (EU) No 1306/2013.

that weaknesses in the implementation of EU water policy have also hindered its integration into the CAP.

Greening is a support scheme under CAP direct payments that remunerates environmental and climate practices at farm level. These include crop diversification, the inclusion of ecological focus areas and the protection of permanent pasture. The Commission considers that greening has the potential to enhance the environmental and climate performance of the CAP compared to the period before its introduction, and overall greening applies to holdings representing a large share of its agricultural area (77% in 2016). However, according to the staff working document on greening it is clear that environmental and climate objectives have not been generally a major factor in the Member States' implementation choices[410]. According to the European Court of Auditors, greening has had a limited impact on the environmental performance of farms at the EU level[411]. The Court concluded that the scheme needed to become more efficient and more consistent with other CAP instruments. This was taken into account in the Commission's proposal for the post-2020 CAP.

EU rural development programmes (RDPs) under the CAP are the main source of funding for the programmes of measures in the second RBMPs, and have therefore significantly contributed to the implementation of WFD. Conversely, a detailed assessment of RDPs for the period 2007-2013 shows that Member States allocated 51% of their RDP budgets to measures that to a greater or lesser extent relate to water. Assessment of the draft RDPs of the third programming period (2014-2020) showed that the RDPs are mostly consistent with the RBMPs with regard to significant pressures such as nutrient and pesticide pollution and hydrological alterations associated with abstraction for irrigation[412]. RDPs fund a diverse range of measures to tackle pollution pressures, from investments in infrastructure and equipment to changes in agricultural practices, the establishment of green infrastructure, land use management, knowledge transfer, innovation management, and the promotion of collaborative projects. A majority of RDPs also explicitly promote improved water management in general, while the implementation of RBMPs is considered in the design of M10 'agri-environment-climate' in most RDPs[413]. However, inconsistencies exist in the reporting of pressures linked to dredging, bed and bank reinforcement, river realignment and impounding for land drainage, food protection and irrigation. It has also been shown that some RDP measures, if not properly designed, could actually contribute to maintaining and/or increasing agricultural pressures, particularly measures on the expansion of irrigation, new land drainage and new embankments[414]. However, instruments exist to avoid these adverse effects in the WFD[415] and Article 46 of the Rural Development Regulation dealing with water abstraction[416]. On this latter subject, investments in irrigation must comply with Article 46, which includes conditions on water savings to improve existing irrigation

[410] European Commission (2018) – SWD(2018) 479

[411] European Court of Auditors Special Report No 21/2017.

[412] WRc (2016).

[413] WRc (2016).

[414] The analysis of RDPs found a number of sub-measures that can maintain or potentially increase agricultural pressures on the water environment, including expansion of irrigation (50% of RDPs), new land drainage (17%), and new embankments (14%). Source: WRc (2016).

[415] Requirements of the WFD to prevent deterioration and not to compromise the achievement of good status/potential, with possible exemption under specific conditions as outlined in Article 4(7).

[416] Article 46 of Regulation (EU) No 1305/2013 sets the conditions for obtaining support from the EAFRD for investments in irrigation. In particular, new installations should offer potential water savings of a minimum of between 5% and 25% in general, and of at least 50% for water bodies whose status has been identified as less than good for reasons related to water quantity.

equipment/infrastructure. In particular, new installations should offer potential water savings of a minimum of between 5% and 25% in general, and of at least 50% for water bodies whose status has been identified as less than good for reasons related to water quantity.

Transport — Inland navigation

Construction of new navigation infrastructure has impacts on water and can hinder the achievement of the WFD objectives. To reduce those impacts, the TEN-T guideline includes provisions requiring projects to comply with environmental law and requiring the performance of environmental assessments. In addition, an exemption to the good navigation status requirements can be granted in case of environmental damage. Article 16 of the TEN-T guidelines establishes priorities for inland waterway infrastructure development, whereas Article 16(e) outlines that priority should be given (among other things) to 'paying particular attention to the free-flowing rivers which are close to their natural state and which can therefore be the subject of specific measures'.

On new navigation projects, there are EU instruments that aim to improve coherence between policies. In particular, according to the WFD, new and existing infrastructure for navigation should be authorised only if the conditions of the exemptions under Article 4(7) are met. The assessment of the second RBMPs shows that navigation is one of the main sectors responsible for hydromorphological alterations, and for which exemptions under Article 4(7) are applied. For projects financed by EU funds, the rules on conditionality aim to ensure that projects financed by EU funds are compliant with all environmental legislation.

There has so far been no assessment of the impacts of the TEN-T policy on water status as the programme has been implemented too recently. An evaluation of the TEN-T guidelines[417] has been launched, with the aim of contributing to the preparation of the new guidelines for the next programming period. The assessment of the implementation of the second RBMPs has shown that progress has been made on integration between those two policies, but there are still issues in some Member States, in particular regarding the implementation of Article 4(7) for new navigation projects. In many cases, the problem is related to the lack of proper methodologies at national level. The lack of integration of environmental requirements at the early stages of project planning is also an issue in many cases.

Navigation activities can also affect chemical status, as ships, boats and the infrastructure to support them can cause a range of environmental problems. In particular, they can lead to direct emissions of contaminants by boats, but also to indirect contamination by remobilisation of contaminated sediments. The use of anti-fouling products has in particular led to contamination of water[418]. Due to aquatic toxicity and persistence, the use of organotin compounds in anti-fouling coatings has been banned since 2008.

Union Civil Protection Mechanism

While the preamble of the Floods Directive mentions the Union Civil Protection Mechanism[419], the articles of the Directive make no mention of coordination specifically with

[417] Regulation (EU) No 1315/2013.
[418] EEA report No 18/2018.
[419] Replaced by Decision No 1313/2013/EU on a Union Civil Protection Mechanism, as amended by Decision (EU) 2019/420. Article 3(1) of the UCPM: 'The Union Mechanism shall support, complement and facilitate coordination of Member States' action in pursuit of the following common specific objectives: (a) to achieve a

civil protection. The Commission's proposal for a Directive mentioned in its preamble that 'The flood risk management cycle which includes the steps Prevention, Protection, Preparedness, Emergency response and Recovery and review should be one of the underlying elements of the flood risk management plans'. In contrast, the FD only stated that 'flood risk management plans should focus on prevention, protection and preparedness'. This was mentioned twice, in the preamble and in Article 7. Still, among the broad range of stakeholders involved in preparing the FRMPs, civil protection authorities were consulted for all FRMPs assessed in 14 of the 26 Member States, and in 19 Member States for at least some units of management. The RescEU Decision[420] in its preamble requires Member States when performing their risk assessments to make full use of the flood risk assessments performed under the FD.

According to Council Directive 2008/114/EC of 8 December 2008 on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection, natural disasters should be taken into account in the critical infrastructure protection process. Since the FD precedes the Critical Infrastructure Directive[421], it makes no reference to it. There is nothing, however, in the FD that prevents Member States from considering critical infrastructure when assessing and mapping flood risk[422], or when deciding on measures.

Fishing and aquaculture

Information reported for the second RBMPs shows that aquaculture activities exert different types of pressure on some water bodies: point and diffuse source pollution, abstractions and hydrological alterations. Aquaculture also requires high water quality and is very sensitive to pressures, so adequate implementation of the WFD is vital for aquaculture production. The Commission published in 2016 a document offering practical guidance to facilitate implementation of the WFD and MFSD as part of the development of sustainable aquaculture[423].

Some representatives of the aquaculture industry consider that the lack of consistency among Member States in interpreting and implementing the WFD does not ensure a level playing field among operators in different EU Member States. Although Directive 2006/113/EC for the protection of shellfish waters was repealed by the WFD, the groundwork it provided is maintained through their new status as protected areas. Further protection is also given under Directive 91/271/EEC, which is of considerable importance given the pressure that inadequately treated and controlled urban waste waters can place on the quality of shellfish waters. The Commission's implementation report on the second RBMPs have found that the implementation of this obligation has been uneven, as in around half of cases Member States have continued to establish the same requirements for the protected areas associated with

high level of protection against disasters by preventing or reducing their potential effects, by fostering a culture of prevention and by improving cooperation between the civil protection and other relevant services;'.

[420] Decision (EU) 2019/420 of the European Parliament and of the Council of 13 March 2019 amending Decision No 1313/2013/EU on a Union Civil Protection Mechanism, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2019.099.01.0041.01.ENG&toc=OJ:L:2019:099:FULL

[421] Council Directive 2008/114/EC

[422] Still, considering that infrastructure identified as critical is supporting vital societal functions, there may be limitations on what is publicly communicated via flood maps.

[423] European Commission (2016) – SWD(2016) 178.

shellfish production. Representatives from the aquaculture sector consider that the WFD does not provide a sufficient level of protection for shellfish production because implementation was found to be inconsistent and incomplete.

An interim evaluation on the open method of coordination between the Commission and Member States on aquaculture policy introduced by the Common Fisheries Policy Regulation was recently carried out[424]. Following the evaluation, a revision of the strategy on the sustainable development of EU aquaculture, including the 2013 Commission Aquaculture Strategic Guidelines and the multiannual national strategic plans of EU Member States has been launched and adoption of the document is expected in 2020. Support to aquaculture from the European structural and investment funds, and especially the European Maritime and Fisheries Fund, is linked to Member States' multiannual national strategic plans and the link will be maintained under the new programming period.

Non-energy extractive industries (NEEI)

The extraction of raw materials provides resources for essential economic activities in the EU, including raw materials needed to the transition to a climate-neutral economy. It is estimated that extractive and processing industries generate 3.4 million jobs, while downstream industries generate around 25 million jobs[425]. The 2008 EU raw materials initiative aims to secure the fair and sustainable supply of raw materials from global markets, the sustainable supply of raw materials within the EU, resource efficiency, and the supply of secondary raw materials through recycling.

Extractive activities are placed where the natural resources exist, with no or very limited possibilities to be relocated. In some cases, they involve high concentrations of certain elements due to natural background levels and/or diffuse pollution. If suitable measures are not implemented, mining activities can affect freshwater ecosystems in different ways through changes in the groundwater and surface water hydrology, or through the release of chemicals and/or sediments in water. Impacts on water will depend on the type of mineral[426,427], mining practices, substances used at the processing stage, and the way mining waste is handled. If not properly addressed, these impacts can occur during the exploitation of the mine, but also long after the cessation of activity.

The Extractive Waste Directive adopted in 2006 provides measures to prevent or reduce as far as possible any adverse effects on the environment and any resulting risk for human health that may result from the management of waste from the extractive industries. These measures should be based, among others, on the best available techniques (BATs), without prescribing the use of any technique or specific technology, but taking into account the technical characteristics of the waste facility, its geographical location and the local environmental conditions. The Extractive Waste Directive does not address emissions to ground or surface water from closed mines that have been flooded with ground water.

On preventing deterioration in water status, the Extractive Waste Directive refers in its Article 13 to EU environmental standards and in particular to the Water Framework

[424] Regulation (EU) No 1380/2013
[425] European Innovation Partnership on Raw Materials (2018).
[426] Dolega et al., 2016.
[427] ERMITE-Consortium et al, (2004).

Directive. Historic mining activities[428] may result in high background levels of priority substances exceeding the limits of the Environmental Quality Standards Directive. Un-rehabilitated former mining sites may be an obstacle to the development of new mines in a given area. Although this legislative framework has led to improvements in waste management, there are still issues regarding water. In particular, the situation is still problematic for mining operations closed before the adoption of the Directive, as these can still result in discharges of mine drainage into water, even long after closure. As for waste facilities closed before the adoption of the Directive, Member States have to prepare an inventory of closed or abandoned waste facilities. Inventories are drawn up on a risk-based approach so that priorities can be set for rehabilitation projects.

The mining industry has provided numerous contributions to the fitness check consultations on the contradictions between the 2008 EU raw materials initiative, which is aimed at supporting EU industrial competitiveness, and the environmental objectives of the WFD and its daughter directives. Contributors have in particular claimed that environmental requirements are hindering the development of new mining activities and the reopening of abandoned sites. This relates to cases where additional emissions could lead to deterioration, even temporarily, of the status of water bodies. As no exemptions are applicable in such cases, these activities cannot be authorised under the WFD.

[428] Bide et al., 2019.