REPORT SUMMARY

Deliverable 1.1

Mapping of end-user groups and governance and synthesis of their demands for knowledge

Date: 25 November 2022

The AquaticPollutantsTransNet partners have received funding from BMBF, ANR and SRC within the 2020 Transfer Project Call, implemented under the ERA-NET Cofund AquaticPollutants of the Joint Programming Initiatives (JPIs) on Water, Oceans and Antimicrobial Resistance (AMR).

Report Summary

This document serves as a summary of Deliverable 1.1 (D1.1) "Mapping of end-user groups and governance and synthesis of their demands for knowledge". **The full version of the report can be viewed here.** All data and information received from external stakeholders have been anonymized in alignment with data protection regulations.

For more results from the ERA-NET Cofund AquaticPollutants, from both the transfer project and the 18 research & innovation projects, visit: http://aquaticpollutants.eu/Resources/Results.html.

Deliverable 1.1 Version History

Work Package	1. Demand for knowledge and knowledge gaps on aquatic pollutants from key water stakeholders
Task	1.2 Current state of knowledge on aquatic pollutants
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Deliverable 1.1 Summary

Pathogens, contaminants of emerging concern (CECs) and antimicrobial resistant bacteria are a rising concern in European water sources, including rivers, estuaries and coastal ecosystems. In 2020, a Joint Transnational Call was launched to fund 18 research and innovation projects focusing on measuring, evaluating and taking actions on the abovementioned "Aquatic Pollutants". To support this call, the transfer project, AqauticPollutantsTransNet ("TransNet"), is investigating innovative strategies and methods for knowledge transfer, scientific networking, and increased public engagement.

As part of this work, the TransNet consortium (DECHEMA, BRGM, ACTeon, IVL, and ISOE) identified the knowledge gaps on aquatic pollutants, defining the needs and demands for knowledge from different stakeholders as well as from the requirements in national and European legislation. **Deliverable 1.1 presents a mapping of water stakeholders and driving forces for France, Sweden, Germany and the European Union (EU). It also reviews the existing national and European policy context and identifies and compares the political demands pertaining to aquatic pollutants.**

Our methodology consisted in identifying and mapping the stakeholders dealing with aquatic pollutants in three countries (Germany, France, Sweden) as well as at the EU level. We carried out an analysis of their working relations and networks, to identify who the core groups are that should be contacted. An overview of the main European institutions or networks dealing with aquatic pollutants was also performed.

KEY TAKEAWAY

Our analysis highlighted the importance of professional networks, working groups and national agencies to support the stakeholders in dealing with emerging contaminants and accessing information about them. We also highlighted the barriers between the public and private sectors, as well as the difficulties of communication between national level organisations and local water managers and authorities.

Key organisations to interact with were selected by considering a balance between the different stakeholder groups (public, private) and roles (problem owner, producer of substances or emitter of pollutants, technology designer, etc.). We interviewed several "key" stakeholders to collect their opinions on the available or missing knowledge on aquatic pollutants, on the challenges in accessing the knowledge as well as on the tools and networks they use to get information or to disseminate their results.

KEY TAKEAWAY

The persons interviewed commented on the wealth of information on aquatic pollutants, which is both perceived positively (when one knows what to look for) and negatively (lack of efficiency and risk of redundancy). ***Data sharing*** *is thus a focus for improvement. The main difficulties reported are in navigating the many databases existing at the European or national level, to understand protocols to ensure comparability of datasets from various sources, to access experimental results from the chemical industry and to collect information on substances' uses and pathways into the environment.*

The identified knowledge gaps can be grouped into three main categories:

- ***Measuring and analysis**: characterizing substances in aquatic systems, defining common assessment parameters and indicators, expanding analytical methods to detect substances at low concentrations and new chemicals.*
- ***Risk assessment and management**: on hazardous substances (PFAS), toxicity of compounds mixture, influence of physical parameters on the becoming of chemical pollutants (especially in the marine environment), AMR, microplastics and nano-plastics.*
- ***Pollution treatment and mitigation techniques**: including the social drivers and behavioural change on the use of chemical products.*

In parallel, the demands from the European and national regulations were assessed in the light of new knowledge production, its capitalisation and dissemination. To do so, a literature review of policy documents in France, Germany and Sweden as well as the EU legislation was undertaken. We analysed if, and how, chemicals of emerging concern (CECs), antimicrobial resistance (AMR) and pathogens are a focus point in European and national legislation in the three countries. Furthermore, we examined the extent to which these substances are part of the requirements regarding monitoring, data transfer and communication.

KEY TAKEAWAY

We concluded that there are strong national regulations in place for pesticides and biocides as well as a few known hazardous substances (i.e. bisphenol or metals), but regulations remain weak for pharmaceuticals, cosmetics or household products. The EU legislation strongly shapes national legislation regarding substance regulations or environmental objectives, while each Member State is responsible for implementing the means to prevent, monitor and remediate pollutions. The legislation, though it sets obligations in terms of sampling and analysis of chemical substances in water, does not rule the transfer and storage mechanisms of this information.

Summary – Chapter 2: Mapping of Water Stakeholders, Driving Forces and Sphere of Influence

To begin identifying the knowledge demands pertaining to aquatic pollutants, it is important to first understand who, either persons or organisations, is active in this field and how these different actors exchange and collaborate with each other. Identifying the "stakeholders"[2] is therefore a key first step in understanding the current situation.

This summary of Chapter 2 provides the key findings related to stakeholders and their networks in the respective countries. **For more information, refer to Chapter 2 in the full report of D1.1.**

Key Findings

Stakeholders

Germany

- There is a large number of actors in the German water sector with varying responsibilities, partly due to the three-tier water management structure, where municipalities are given the responsibility for implementation.
- Stakeholders from various fields (research institutions, universities, water suppliers) are well connected through associations and via participation in funded research initiatives. However, exchange with local authorities is limited.

France

- There are many organizations involved in the topic of aquatic pollutants, some of them joining forces to develop expertise and projects.
- However, the number of experts of CEC, AMR or pathogens within each organization is small and the professionals know each other's fairly well.

Sweden

- The management of water bodies is performed by regional water authorities, based on water catchments. The Water Authorities are housed at five County Administrative Boards, and prepare cases for regional Water District Boards, that decide on environmental quality standards, measures and management plans. They have support from a multitude of local networks of stakeholders for different water bodies concerning implementation of measures.
- Many different actors can be viewed as stakeholders dealing with CECs, AMR and pathogens in water, from the support and advisory role of the government agencies, through the management levels of the Water Authorities to the municipal water and wastewater companies. These collaborate with universities and research institutes or with environmental or technical consultants and commercial environmental labs.

Cross-national perspectives

- The water sector is fragmented, small-scale units providing drinking water or dealing with wastewater treatment.
- The management of aquatic pollutants is centralised at the national level in France, contrary to the other two countries.
- AMR and pathogens are managed by dedicated organisations or networks in Germany and Sweden, contrary to France.
- There are barriers between the private sector and the public sector in all three countries.

[2] Stakeholder means any people or groups who are positively or negatively impacted by a project, initiative, policy or organisation.

Stakeholder Networks

Germany

- Private companies (e.g. technology development) are to a certain extent an active part of the German stakeholder network, but they also have their own networks (i.e. GWP, Mechanical Engineering Industry Association [VDMA]).
- There are various networks within the German field of aquatic pollutants, including technical communities and policy-oriented communities, combining stakeholders from various sectors.

The abundance of networks helps with knowledge transfer, but one must know which network is most suitable to access the needed information.

Sweden

- There are several associations through which stakeholders are connected, the most pronounced being Swedish Water.
- Concerning AMR, the association Strama works for a responsible use of antibiotics and their work has resulted in Sweden having a comparatively restrictive use of antibiotics.

France

- There are many professional networks in the water sector – each dedicated to a different category of stakeholders: networks for the local authorities and water managers, research networks, networks for the water industry sector, etc.
- No network is solely focused on aquatic pollutants.

Cross-national perspectives

- AMR and pathogens are managed for some years by dedicated organisations or networks in Germany and Sweden. In France, an AMR dedicated network has very recently been launched.
- The NORMAN network is composed of more than 80 universities, research institutes, and agencies. It coordinates interlaboratory comparisons, promotes collaborative research projects and maintains database infrastructure for prioritization of emerging contaminants, concentrations in environmental compartments, substance and (eco)toxicity data, mass spectra, digitalized archiving of sample raw data, etc.

Summary – Chapter 3: Synthesis of Stakeholder Demands for Knowledge

Once the stakeholder directories were in place and the relevant actors identified, the consortium organized interviews in order to contribute to 1) the understanding of the stakeholders' roles (see Chapter 2), 2) the evaluation of the available knowledge and the knowledge gaps, 3) the identification of currently applied knowledge transfer tools, and 4) the characterization of the regulatory demand regarding CECs, AMR and pathogens.

This summary of Chapter 3 provides the key findings related to stakeholders and their knowledge demands and lists the stakeholders who were interviewed by TransNet. **For more information regarding methodology and findings, refer to Chapter 3 in the full report of D1.1.**

Key Findings

Knowledge Demands

Germany

- Almost all sectors have knowledge demands for treatment and mitigation techniques.
- A specific demand from the public sector relates to data sharing for the registration process of chemicals and substances: more information from other sectors is needed.
- The network of aquatic pollutant stakeholders, consisting of associations and organizational networks, is the key communication channel.

France

- Improvement of monitoring is a shared concern that each actor tries to solve with its own skills.
- There are many initiatives to transfer knowledge in a wide range of formats.
- Communication remains difficult in between the categories of actors involved.

Sweden

- There is not enough coordination of the monitoring that is done within Sweden.
- Dysfunctions have also been noted on the low level of control over what substances may be placed on the market, with consequences for the environment and health.
- Social drivers and behavioural change are a new field to investigate.
- The language barrier has been mentioned as the reason of difficulties to get comparative information across countries.

Europe

- Persons interviewed did not report knowledge gaps but rather current topics on the agendas: microplastics and nano-plastics, AMR, toxicity of compounds mixture, influence of physical parameters on the becoming of chemical pollutants, management of the PFAS pollution, reuse technologies and nature-based solutions.
- They regret the lack of information available in the EU databases about the real uses of substances for human activities nor the exposure pathway to the environment.
- The lack of homogeneity among the EU countries, as well as the long delay to access the data are perceived as the main barriers to act.
- There is no database to retrieve information about the presence of antibiotics in the environment, or the monitoring of micro- and nano-plastics.
- In terms of sources of information, the connection to experts is central, as well as knowing about the research projects funded by the EU. Up-to-date information can also be accessed through literature reviews produced by PhD students and through social media.

Cross-national perspective

- Monitoring needs to be improved to make it consistent, permanent, reliable and comparable.
- Several stakeholders mentioned that the sheer amount of information or knowledge available on CECs, AMR and pathogens is what inhibits knowledge transfer, not the lack of it.
- The wealth of information can be misleading unless you are already active in the right networks, know the right persons or have experience navigating the official databases. Centralizing this knowledge and disseminating it more efficiently is a central need for improvement.
- A common knowledge gap has been identified regarding the toxicity of substances (and cocktail mixtures) in the environment.
- Knowledge gaps have been reported on the information pertaining to hazardous substances (PFAS at the top of the list) or AMR and associated risks.
- Stakeholders from all sectors stated knowledge gaps concerning measuring, analysing and characterizing substances in aquatic systems such as the need to define assessment parameters and indicators and analytical methods to detect substances at low concentrations and new chemicals/substances.

Stakeholder Interviews – Germany

Table 1. Summary of conducted interviews with German stakeholders. The stakeholder organisations have been anonymised for their data protection.

Sector	Name in Deliverable	Interview Date	Status	Field of Work	Targeted Compounds	Role regarding Aquatic Pollutants	Targeted Environmental Media
Operator	Operator A	13.04.2022	Public	Wastewater disposal, water maintenance, precipitation management Specifically: investment plans, strategies, citizen services, technology assessment	Regulated (pathogens, biocides) and non-regulated (CECs, AMR)	Problem owner: end-of-pipe Solution provider: water treatment	Wastewater, rainwater
	Operator B	20.04.2022	Public	Drinking water supply - Analytical chemist in laboratory for operation control and research, focusing on new contaminants & organic micropollutants	Regulated (pathogens, biocides) according to the Drinking Water Ordinance and non-regulated (CECs, AMR)	Problem owner: end-of-pipe Solution provider: water treatment	Drinking water, surface water
	Operator C	26.04.2022	Public	Drinking water monitoring & analysis, research & development	Regulated substances	Problem owner: end-of-pipe	Drinking water
	Operator D	09.05.2022	Public	Drinking water and service water production, wastewater treatment	Regulated substances	Problem owner, solution designer, solution provider	Fresh groundwater, drinking water, municipal wastewater

Sector	Name in Deliverable	Interview Date	Status	Field of Work	Targeted Compounds	Role regarding Aquatic Pollutants	Targeted Environmental Media
				Specifically: Asset management and strategic planning			
	Operator E	20.05.2022	Public	Wastewater treatment plant operator, water management & chemical engineering studies	Regulated (pathogens, biocides) and non-regulated (CECs, AMR)	Problem owner: end-of-pipe Solution provider: water treatment	Fresh surface water, wastewater
Authority	Authority A	13.04.2022	Public	Surface water quality monitoring and assessment, supporting regional authorities with decision making, designing recommendations & guidelines, supporting implementation of the 4th treatment step	Persistent organic micropollutants, CECs, biocides	Permission & control, characterization, risk assessment; solution provider (treatment measures)	Surface water, groundwater, drinking water wastewater, industrial wastewater
	Authority B	26.04.2022	Public	Division Director with focus on circular economy, soil conservation, groundwater management, permission & control	CECs; pathogens; natural, anthropogenic, radioactive substances, heavy metals	Regulator, permission & control	Groundwater, drinking water
	Authority C	28.04.2022	Public	Toxicologist in Department of Drinking and Swimming Pool Water, conducting chemical & toxicological evaluations	Regulated substances	Permission & control, risk assessment	Drinking water, swimming pool water
	Authority D	16.05.2022	Public	Point of contact for authorities, laboratory analysis	All regulated substances in the German Drinking Water Ordinance	Permission & control	Groundwater
Business	Business A	25.04.2022	Private	Research & development for products, technologies, and applications	Trace substances, micropollutants, PFAS, pharmaceuticals, endocrine disruptors, CECs	Solution provider: development of technologies	Wastewater, industrial wastewater, drinking water

Sector	Name in Deliverable	Interview Date	Status	Field of Work	Targeted Compounds	Role regarding Aquatic Pollutants	Targeted Environmental Media
Supplier	Supplier A	05.05.2022	Private	Environmental manager responsible for monitoring environmental emissions; close cooperation with wastewater treatment plant at the chemical park	REACH-regulated substances and federally mandated discharge limits	Producer of pesticides	Industrial wastewater, crop protection & agriculture
Healthcare	Healthcare A	27.04.2022	Public	Division on water & environment, conducting analytics for hygiene & water chemistry	CECs - especially antibiotics, AMR & pathogens	Characterization, risk assessment, advisory support for authorities & water suppliers	Surface water
NGOs/ Associations	Association A	23.05.2022	Private non-profit	Technical rules and regulations for water protection, target & non-target analyses	Regulated (pathogens, biocides) and non-regulated (CECs, AMR)	Solution provider: water treatment	Drinking water, wastewater
	Association B	26.04.2022	Private non-profit	Consulting & research, focus areas of water, flocculation & membranes	Organic micropollutants	Solution designer	Groundwater, surface water, wastewater, drinking water
Research, Academia	Research A	20.04.2022	Public	Research, knowledge transfer and consulting for external expert groups	Regulated (pathogens, biocides) and non-regulated (CECs, AMR)	Solution designer, characterization & risk assessment	Wastewater, groundwater, surface water
	Research B	21.04.2022	Public	Department of Soil Culture, Environmental Chemistry, Food, Biotechnology, research project management	Regulated (pathogens, biocides) and non-regulated (CECs, AMR)	Solution designer, characterization & risk assessment	Wastewater, surface water
	Research C	26.04.2022	Public	Research focus on environment & resource use, wastewater reuse, research & development	Regulated (pathogens, biocides) and non-regulated (CECs, AMR)	Characterization & risk assessment, solution designer	Municipal wastewater, drinking water
	Research D	17.05.2022	Public	Antibiotic resistance in the wastewater treatment sector and associated impacts on environment and health	Regulated (pathogens, biocides) and non-regulated (CECs, AMR)	Solution designer, risk management	Fresh water, aquatic bacteria (not fauna), municipal & industrial wastewater, drinking water

Stakeholder Interviews – Sweden

Table 2. List of organizations interviewed in Sweden to determine stakeholders' demands.

Sector	Organization	Inter-view Date	Status	Field of Work	Targeted Compounds	Role regarding Aquatic Pollutants	Targeted Environmental Media
Operator	Association for 11 municipals north of Stockholm (Käppalaförbundet) *Third largest treatment plant in Sweden*	21.06. 2022	Public	Strategies and planning; mostly Permission / control of (water related) operations / activities upstream issues and recipient responsibility, outgoing water.	CECs- based on the water directive. All hazardous substances and phase-out substances.	Producer of substances / Emitter - Wastewater plant, so there is emitting because not everything is purified. Solution designer Characterization and risk assessments	Domestic wastewater Industrial wastewater Aquatic fauna - based on the water directive.
	Municipal water company (Vivab) Varberg and Falkenbergs municipality	20.04. 2022	Public	VA issues and recycling, waste management.	Unregulated: on a pilot scale, reduction of bacteria from the treatment plant, reduction of other micro-pollutants, drug residues above all. CECs - The same pilot who removes other contaminants. AMR - Does not work directly but works to remove drug residues so it becomes indirect.	Producer of substances / Emitter Solution designer - for us not solutions for everyone. Process solutions.	Fresh surface water Fresh groundwater Drinking water Domestic wastewater Industrial wastewater

Sector	Organization	Inter-view Date	Status	Field of Work	Targeted Compounds	Role regarding Aquatic Pollutants	Targeted Environmental Media
Authority	Swedish EPA (Naturvårdsverket). Department of contaminants	07.06. 2022	Public	Environmental monitoring provides a basis for following up environmentally hazardous activities. Emissions etc. NV is also responsible for guidance for supervision of activities that affect the aquatic environment, treatment plants and industries.	CECs: Not regulated. Also, contaminants that are regulated.	Characterization and risk assessment /Regulator / Solution designer - Policy development - regulation of activities - emissions of pollutants that may emit to the aquatic environment. Polluted areas, with follow-up of condition in the environment.	Fresh surface water Marine water Fresh groundwater Brackish water Domestic wastewater Terrestrial fauna Industrial wastewater
	Swedish Medicinal Products Agency (Läkemedelsverket) Swedish Knowledge Centre on Pharmaceuticals in Environment (Kunskapscentrum för läkemedel i miljön).	08.06. 2022	Public	Strategies / Planning	Regulatory level. - government assignment to work with drug contamination. Reduce impact of the pharmaceutical environment. Start of pipe and end of pipe. Also involved in sludge management at policy level.	Characterization and risk assessment - Make risk assessments of effects from drugs. Most often in relation to water in recipient/Solution provider/ Regulatory policy-wide	All at an overall level.
Business	Nordic water Part of a Swiss company – Sulzer.	30.06. 2022	Private	Understanding of water purification processes, applications and functions development department and strategic decisions. Water treatment, movement of water, i.e. pumps, water management and wastewater management, including industrial water management.	Do not handle, but customers want to reduce these substances in their water. Often municipal treatment plants - in outgoing wastewater which is seen as pollution in government requirements.	Solution designer - for handling substances present in water. Water purification equipment. Solution provider	Fresh surface water Marine water (International markets - desalination production Fresh groundwater Brackish wate Drinking water Industrial wastewater

Sector	Organization	Inter-view Date	Status	Field of Work	Targeted Compounds	Role regarding Aquatic Pollutants	Targeted Environmental Media
Supplier	Xylem Water Solutions Supplier of equipment for water and sewage treatment plants and pumping stations. Provides services to products	01.07. 2022	Private	Key Account treatment: products around offers and purification. Transport = pumps. Treatment = filtration, aeration, stirrers, particle separation.	In the company but not in the role	Designs solutions - /Solution provider	Fresh surface water / Fresh groundwater/ Drinking water / Domestic wastewater Industrial wastewater (priority business area)
NGO/ Associations	Swedish water (Svenskt vatten)	18.05. 2022	Private non-profit	Industry organization for municipal companies. A corporation owned by an association of municipal water and sewerage companies.	Everything in different ways. The least with pathogens	Problem owner /solution provider	Fresh surface water / Aquatic fauna / Fresh groundwater / Brackish water / Terrestrial fauna
	Mälaren's water management association (Mälarens vattenvårdsförbund)	24.05. 2022	Public non-profit	Association with ca. 60 member organizations (municipalities/ treatment plants) around Lake Mälaren: county administrative boards, water councils, water management associations, water producers, regions and larger companies, the fishing association LRF and the Swedish Society for Nature Conservation.	CECs	Solution designer / Water resource manager / Solution provider / Characterization and risk assessment / Other: Environmental monitoring and follow-up - control and sampling of water pollutants.	Fresh surface water / Drinking water / Domestic wastewater /Industrial wastewater /Aquatic fauna

Sector	Organization	Inter-view Date	Status	Field of Work	Targeted Compounds	Role regarding Aquatic Pollutants	Targeted Environmental Media
	STRAMA Collaboration against antibiotic resistance, a network in Sweden that must exist in each region.	13.07. 2022	Public associa tion	Strama in region Västra Götaland and at national level.	Not at Strama (AMR)	Awareness of the risk of antibiotic release during production, has been clearly highlighted. Main task is to develop and bring forward treatment guidelines for bacterial infections to clinically active doctors.	Strama does not work with those issues. In research, wastewater, and resistance genes in lakes, etc.

Stakeholder Interviews – France

Table 3. List of organisations interviewed in France.

Name or organisation	Name of Department/Laboratory/Service	Status	Role
Agences de l'eau	Rhone-Méditerranée	Public state organisation	Problem owner
AQUAREF - Laboratoire national de référence pour la surveillance des milieux aquatiques	N/A	Associations & NGOs	Characterization and risk assessment
BIOMAE	N/A	Private organisation - tertiary sector (services, studies)	Characterization and risk assessment
BRGM	Direction de la Recherche, de la Programmation scientifique et de la Communication (DRPC)	Public research organisation	Characterization and risk assessment
France Water Team	N/A	Associations & NGOs	Solution provider
GRAIE	N/A	Associations & NGOs	Solution provider
Ifremer	Unité Biogéochimie et Ecotoxicologie	Public research organisation	Characterization and risk assessment
INERIS	Direction Scientifique	Public research organisation	Characterization and risk assessment
INRAE - Institut Carnot	N/A		
INSERM	UMR 1092	Public research organisation	Characterization and risk assessment
MTES - Ministry of Environment	Bureau de la Lutte contre les Pollutions Industrielles et Domestiques - Direction de l'Eau et de la Biodiversité	Public state organisation (government representatives)	Regulation & Control
OFB	N/A	Public state organisation (government representatives)	Regulation & Control
SIBA (Syndicat Intercommunal du Bassin d'Arcachon)	N/A	Public territory organisation (communities, provinces)	Problem owner

Name or organisation	Name of Department/Laboratory/Service	Status	Role
TreeWater	N/A	Private organisation - secundary sector (industry)	Solution designer
WatchFrog	Laboratoire dédié à l'identification des perturbateurs endocriniens	Private organisation - tertiary sector (services, studies)	Characterization and risk assessment

Stakeholder Interviews – European Level

Some representatives of the major European networks were interviewed in order to get a deeper understanding of their role as well as their perceived issues on aquatic pollutants and knowledge transfer. Their view complements the national evaluations of the stakeholder demands from an EU perspective.

Table 4. List of organizations interviewed at the EU level.

Name or organisation	European Network or Institution	Interview Date
DELTARES	Water Europe - Water & Zero Pollution WG Leader	04/07/2022
Luleå University	Water Europe - Water & Zero Pollution WG Co-Leader	07/07/2022
Umweltbundesamt (UBA)	European Topic Center (ETC) "Inland, Coastal and Marine" Waters	06/07/2022
Fundación AZTI	European Topic Center (ETC) "Inland, Coastal and Marine" Waters	22/06/2022
Thames Water Utilities Limited	Water Reuse Europe	30/06/2022
EurEau	EurEau	01/07/2022
European Environment Agency	European Environment Agency	05/07/2022

Summary – Chapter 4: Review of the Existing Policy Context, Identification and Comparison of the Political Demand

The scope of the literature review is to see if, and how, chemicals of emerging concern (CECs), antimicrobial resistance and pathogens are a focus point in European and national legislation in France, Germany and Sweden. Furthermore, we examined the extent to which these substances are part of the requirements regarding monitoring, data transfer and communication. Since the European context heavily influences the national legislation, we also describe the regulatory demand at the EU level.

This summary of Chapter 4 provides the key findings related to the regulatory context and the demands that stem from it. **For more information, refer to Chapter 4 in the full report of D1.1.**

Key Findings

Policy Context

Europe

- Biocides, PPP and pharmaceuticals have their own pieces of legislation ruling their production, marketing and use, considering the goals set by the environmental legislations regarding the chemical quality of water bodies.
- However, in the absence of specific environmental thresholds or substance lists, most biocides and pharmaceuticals have weak constraints to their release in the environment. Endocrine Disrupting Compounds (EDC), water-borne pathogens, metals (and now PFAS) are listed in the environmental legislation.
- AMR is not yet integrated into binding legislation at the EU level.
- EU legislation prioritizes its focus on acting at the source (regulation of human activities and associated water contaminants) and promotes risk assessments.
- EU legislation defines goals, common criteria and joint strategies. The Member States remain responsible for defining and implementing the means to reach the EU objectives.
- There are few substances for which threshold values are agreed-upon at the EU level, even more so for water bodies that have no direct use for human consumption. The Member States are responsible for defining the threshold values for the chemical substances they monitor in the environment.
- The EU legislation sets strict criteria and reporting procedures as regards the necessary justifications before placing a chemical product on the market. Member States are the competent authorities for allowing chemical products on the EU market.
- Regulations are slow to be drafted once substances have been identified as harmful.
- No standards are yet defined at the EU level to monitor the situation about AMR spread.
- Member States are compelled to report the state of their water resources periodically – including the presence of pollutants. The reporting is specific to each Directive. However, there is a lack of mandatory data collection involving the end-users of the products to inform about the pathways towards the aquatic environment.
- Several platforms or databases are in place to collect information on point source and diffuse pollution but seem insufficient to meet the EU's ambitions because the data is consolidated at the national / regional / basin level, which is too coarse for impact assessments.
- Public and free access to information on aquatic contaminants has not been a priority in EU legislation in the last decades. Recent initiatives tend to remediate this point.

Germany

- Knowledge transfer and reporting requirements for water stakeholders are not specified by German legislation.
- However, various open-access databases on AMR, biocides and further hazardous substances including EDC, pharmaceuticals and pesticides are publicly available.
- Strategy papers emphasize the importance of knowledge transfer and the need to improve access to data concerning micropollutants.
- Water stakeholders consider EU and national legislations to be driving forces for their work related to aquatic pollutants.
- The German Environment Agency (UBA) is considered a helpful resource by many stakeholders.
- Existing regulations are in some cases not precise enough (i.e. do not include all relevant information, such as toxicity concentrations, threshold values, etc.).
- Guidelines are needed for substances or compounds that are newly discovered or not yet regulated (i.e. AMR, micropollutants).

Sweden

- Sweden's regulations regarding water management are strongly influenced by EU legislation. Centrals are the EU WFD & Environmental Quality Standards (EQS).
- Local rules are negotiated by the Water Delegations in each water district.

France

- Regulatory short-comings are pointed-out regarding AMR, groundwater and marine environments. Microplastics are poorly covered by French legislation.
- In addition, French authorities have dedicated means to the monitoring and reduction of other CEC especially EDC, solvents and metals which are relevant for the country.
- Risk management of pharmaceuticals in the aquatic environment is problematic due to the lack of transparency regarding these products, but the issue has been identified by authorities and monitoring is in place.
- There are many pieces of legislation listing substances to be monitored, monitoring protocols or quantification methods. The updates or modifications are frequent.
- A paradigm change is needed to better regulate and monitor all substances in terms of their properties / effects.
- The reviewed texts did not contain information on the ruling of the centralization of the data, but national platforms exist to facilitate access to water monitoring results
- The French legislation on aquatic pollutants does not rule the dissemination of data and knowledge which is collected as part of the obligations of the water authorities and supporting agencies
- Improvements regarding information and data access are demanded by the successive action plans dealing with aquatic pollutants (especially on AMRs and EDC).

Cross-national perspectives

- The EU legislation is strongly shaping the national legislations regarding substances regulations or environmental objectives. When new issues emerge, the authorities wait for the EU to take the lead and negotiate the rules.
- National agencies are key to translate EU directives and regulations into national texts and support the stakeholders through guidelines
- Little freedom is allowed at the regional or river basin district levels to deviate from the EU or national rules regarding substances to be monitored in water or monitoring protocols.
- There is a lack of information in the legislation regarding toxicity levels, maximum concentrations or threshold values that shall be applied for the assessments of risks

European Regulatory Documents Reviewed

Table 5. List of EU-level policy documents and strategies reviewed by TransNet.

Title	Acronym	Reference number	Summary
EU Water Framework Directive	WFD	2000/60/EC	The directive is to achieve good status in all bodies of surface water and groundwater by 2027. The WFD covers surface water pollutants in 2 ways: 1) By identifying and regulating those of greatest concern across the EU (priority substance list = Annex X) 2) Requiring MS to identify substances of national or local concern
DIRECTIVE on the protection of groundwater against pollution and deterioration	GWD	2006/118/EC	It's a directive on the protection of groundwater against pollution and deterioration. which sets groundwater quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater.
DIRECTIVE on priority substances in the field of water policy	PSD	2013/39/EU	This directive incorporates 45 substances which should be monitored, and the necessary actions need to be taken in order to meet the environmental quality standards.
DECISION establishing a watch list of substances for Union-wide monitoring in the field of water policy	Watch List	2018/840	This is a "Commission Implementing Decision" of the EQS/PSD, that constitutes the last update of a watch list of substances that may pose a significant risk and for which monitoring data are insufficient to conclude on the actual risk posed.
Environmental Quality Standards Directive	EQS	2008/105/EC	It sets environmental quality standards (EQS) for the substances in surface waters identified as priority pollutants because of the significant risk they pose to or via the aquatic environment.
DIRECTIVE on public access to environmental information	PAEI	2003/4/EC	The objectives of this Directive are: (a) to guarantee the right of access to environmental information held by or for public authorities and to set out the basic terms and conditions of, and practical arrangements for, its exercise; and (b) to ensure that environmental information is progressively made available and disseminated to the public in order to achieve the widest possible systematic availability and dissemination to the public of environmental information.
DIRECTIVE concerning the prohibition on the use in stock farming of certain substances having a hormonal or thyrostatic action and of beta-agonists	HTBA	96/22/EC	Member States shall prohibit the placing on the market of the substances listed in Annex II for administering to any animals, the meat and products of which are intended for human consumption
COMMISSION DECISION laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment	GESMW	2017/848	This Decision lays down: (a) criteria and methodological standards to be used when determining a set of characteristics for good environmental status; (b) specifications and standardised methods for monitoring and assessment; (c) a timeline for the establishment of threshold values, lists of criteria elements and methodological standards; (d) a notification requirement for criteria elements, threshold values and methodological standards.

Title	Acronym	Reference number	Summary
DIRECTIVE concerning the management of bathing water quality	BWD	2006/7/EC	This Directive lays down provisions for: (a)the monitoring and classification of bathing water quality; (b) the management of bathing water quality; (c) the provision of information to the public on bathing water quality. The purpose of this Directive is to preserve, protect and improve the quality of the environment and to protect human health. This Directive shall apply to any element of surface water where the competent authority expects a large number of people to bath and has not imposed a permanent bathing prohibition or issued permanent advice against bathing.
Directive on the quality of water intended for human consumption	DWD	2020/2184	This directive ensures the quality of water intended for human consumption and thus protect human health. Additionally the directive aims to avoid and treat contamination by applying water safety plans using risk assessments.
Sustainable Development Goals	SDG		The Sustainable Development Goals (SDGs) are a collection of 17 interlinked global goals designed to be a "blueprint to achieve a better and more sustainable future for all".
REGULATION concerning the making available on the market and use of biocidal products	Biocides	528/2012	The purpose of this Regulation is to improve the free movement of biocidal products within the Union while ensuring a high level of protection of both human and animal health and the environment.
Strategic guidelines for a more sustainable and competitive EU aquaculture for the period 2021 to 2030	Aquaculture	COM/2021/ 236	This document is the last update of the Commission's Strategic Guidelines for the sustainable development of EU aquaculture adopted in 2013. It constitutes the main pillar of the strategic coordination of aquaculture policy in the EU.
Directive on undesirable substances in animal feed	DUSAF	2002/32/EC	This directive sets maximum levels for undesirable substances and products in animal feed including imports on the EU market.
REGULATION laying down Union procedures for the authorisation and supervision of medicinal products for human use	Monitoring	726/2004	The purpose of this Regulation is to lay down Community procedures for the authorisation, supervision and pharmacovigilance of medicinal products for human and veterinary use, and to establish a European Medicines Agency.
DIRECTIVE on animal health requirements for aquaculture animals and products, and on the prevention and control of certain diseases in aquatic animals	Aquaculture	2006/88/EC	This directive sets out: -animal health requirements for the sale, import or transit of aquaculture animals (farmed fish and shellfish); -minimum measures to increase general awareness and prevent disease; -minimum measures in the event of a suspected, or established, outbreak of disease
Marine Strategy Framework Directive	MSFD	2008/56/EC	The Directive is the environmental pillar of Europe's maritime policy designed to create a framework for sustainable use of Europe's marine waters. It provides a legislative framework to sustainably manage human activities at all scales - from local to national to regional seas. The MSFD promotes an Ecosystem Approach to reach Good Environmental Status (GES) by 2020.

Title	Acronym	Reference number	Summary
REGULATION concerning the placing of plant protection products on the market	PPP	1107/2009	The purpose of this Regulation is to ensure a high level of protection of both human and animal health and the environment and to improve the functioning of the internal market through the harmonisation of the rules on the placing on the market of plant protection products, while improving agricultural production.
A European One Health Action Plan against Antimicrobial Resistance (AMR)			The goals of this action plan are to: -improve awareness and understanding of AMR through effective communication, education and training; -strengthen the knowledge and evidence base through surveillance and research; -reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures; -optimize the use of antimicrobial medicines in human and animal health; -develop the economic case for sustainable investment that takes account of the needs of all countries and to increase investment in new medicines, diagnostic tools, vaccines and other interventions.
DIRECTIVE on the Community code relating to medicinal products for human use	MPHU	2001/83/EC	This Directive shall apply to medicinal products for human use intended to be placed on the market in Member States and either prepared industrially or manufactured by a method involving an industrial process.
REGULATION on veterinary medicinal products	Veterinary	2019/6	This Regulation lays down rules for the placing on the market, manufacturing, import, export, supply, distribution, pharmacovigilance, control and use of veterinary medicinal products.
REGULATION on the manufacture, placing on the market and use of medicated feed	Medical feed	2019/4	This Regulation lays down specific provisions regarding medicated feed and intermediate products. This Regulation does not apply to veterinary medicinal products.
DIRECTIVE on urban wastewater treatment	UWWTD	91/271/EEC	This directive focusses on the performance of WWTP and the maximum allowable emissions. The emissions depend on the receiving water body and the size of the WWTP.
EU Mission: Restore our Ocean and Waters			The goal of this mission is to help achieve a full recovery and regeneration of European marine and freshwater ecosystems by 2030, with a holistic approach towards a better understanding of the human footprint (including climate change), innovative governance, better connections between water and the public.
European Union Strategic Approach to Pharmaceuticals in the Environment	Pharmaceuticals	COM(2019) 128	OBJECTIVES: - identify actions to be taken or further investigated to address the potential risks from pharmaceutical residues in the environment, not least to contribute to the Union's action on combatting antimicrobial resistance; - encourage innovation where it can help to address the risks, and promote the circular economy by facilitating the recycling of resources such as water, sewage sludge and manure; - identify remaining knowledge gaps, and present possible solutions for filling them;

Title	Acronym	Reference number	Summary
Chemicals Strategy for Sustainability - Towards a Toxic-Free Environment	Chemicals	COM(2020) 667	This white paper informs about the complexity regarding a toxic-free environment and the related facts. Furthermore, EU's philosophy on the matter is transcribed.
Pathway to a Healthy Planet for All EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil'	Zero Pollution	COM(2021) 400	Air, water and soil pollution is reduced to levels no longer considered harmful to health and natural ecosystems and that respect the boundaries our planet can cope with, thus creating a toxic-free environment.
On the experience gained by Member States on the implementation of national targets established in their National Action Plans (NAPs) and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides	Return of Experience	COM(2020) 204	Less than one third of Member States have completed the review of their NAPs within the five-year legal deadline. Of those that have reviewed their NAPs, most have failed to address the weaknesses identified by the Commission, with just 20% of revised NAPs setting high-level, outcome-based targets, as part of a longer-term strategy to reduce the risks and impacts of pesticide use. Despite these weaknesses, Member States have made progress in implementing the SUD. The majority of Member States have established comprehensive systems for the training and certification of operators, and a range of measures for water protection and the safe handling and storage of pesticides.
Registration, Evaluation, Authorisation and Restriction of Chemicals	REACH	1907/2006	Containing several criteria for ranking the substance in terms of persistency, toxicity, etc.
REGULATION concerning the establishment of a European Pollutant Release and Transfer Register	PRTR	166/2006	This Regulation establishes an integrated pollutant release and transfer register at Community level in the form of a publicly accessible electronic database and lays down rules for its functioning, in order to facilitate public participation in environmental decision-making, as well as contributing to the prevention and reduction of pollution of the environment.
DIRECTIVE establishing a framework for Community action to achieve the sustainable use of pesticides	Pesticides	2009/128/EC	This Directive establishes a framework to achieve a sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment and promoting the use of integrated pest management and of alternative approaches or techniques such as non-chemical alternatives to pesticides.
DIRECTIVE on industrial emissions (integrated pollution prevention and control)	IED	2010/75/EU	This Directive lays down rules on integrated prevention and control of pollution arising from industrial activities. It also lays down rules designed to prevent or, where that is not practicable, to reduce emissions into air, water and land and to prevent the generation of waste, in order to achieve a high level of protection of the environment taken as a whole.
REGULATION on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and PPP	Controls	2017/625	Specific rules on official controls and for action taken by the competent authorities in relation to plant protection products (PPP)
REGULATION on pharmacologically active substances and their classification regarding maximum residue limits in foodstuffs of animal origin	PAS classification	37/2010	Pharmacologically active substances and their classification regarding maximum residue limits (MRL) are set out in the Annex.

Title	Acronym	Reference number	Summary
REGULATION laying down Community procedures for the establishment of residue limits of pharmacologically active substances in foodstuffs of animal origin	PAS residue limits	470/2009	For the purposes of ensuring food safety, the regulation sets: (a) the maximum concentration of a residue of a pharmacologically active substance which may be permitted in food of animal origin (maximum residue limit); (b) the level of a residue of a pharmacologically active substance established for control reasons in the case of certain substances for which a maximum residue limit has not been laid down
Evaluation of Regulation (EC) No 1107/2009 on the placing of PPP on the market and of Regulation (EC) No 396/2005 on maximum residue levels of pesticides	Evaluation of PPP	COM(2020) 208	The evaluation found that the PPP Regulation is largely effective in protecting human health and the environment due to the stringency of the approval criteria. The PPP Regulation has in particular been effective in further phasing out of high-risk substances.

German Regulatory Documents Reviewed

Table 6. Policy documents and strategies reviewed as part of the German regulatory context analysis.

Document Title	Acronym	Pollutants Targeted	Summary
German Water Law (Wasserhaushaltsgesetz)	WHG (2009)	See daughter ordinances	Implementation of the EU WFD. Sets legal conditions for the management of water in terms of quantity and quality, and to control human impacts on water bodies
Wastewater Ordinance (Abwasserverordnung)	AbwV (2004)	Lists targeted substances specific for 52 industries	Contains requirements for the discharge of (municipal, industrial, commercial) wastewater into water bodies, establishes best available techniques (BAT), specifies the analysis and measurement procedure for wastewater
Groundwater Ordinance (Grundwasserverordnung)	GrwV (2010)	Organic compounds, trace metals, nitrates, phosphates	Defines the chemical status of groundwater, identifies parameters for which national threshold values should be derived, identifies measures to prevent or limit pollutants into groundwater
Surface Waters Ordinance (Oberflächengewässerverordnung)	OGewV (2016)	Metals, chemicals, herbicides, insecticides	Specifies EU-wide good ecological status requirements, rules for monitoring substances from the European watch list, an updated list of pollutants.
Ordinance for Facilities Handling Substances Hazardous to Water (Verordnung für Anlagen zum Umgang mit Wassergefährdenden Stoffen)	AwSV (2017)	Substances ordered into water hazard classes	Implements the EU WFD and Nitrates Directive by classifying substances and their mixtures according to hazardousness to water and outlining requirements for facilities handling such substances.
Drinking Water Ordinance (Trinkwasserverordnung)	TrinwV (2001)	Bacteria, chemicals, trace metals, pesticides, biocides	Specifies the requirements for drinking water quality and the processing and disinfection of drinking water

Document Title	Acronym	Pollutants Targeted	Summary
Ordinance on the Placing on the Market of Fertilizers, Soil Additives, Culture Substrates and Plant Auxiliaries 1 (Düngemittelverordnung)	DüMV	Nutrients, metals, organic materials, chemicals	Regulates the approval and labelling of fertilizers, soil additives, and plant aids. Defines labelling requirements for thresholds and limit values.
Ordinance on the Application of Fertilizers, Soil Additives, Culture Substrates and Plant Auxiliaries in Accordance with the Principles of Good Fertilizing Practice 2 (Düngeverordnung)	DüV		Establishes good agricultural practice regarding the use of fertilizers, including rules concerning emission abatement.
Federal Soil Protection Act (Bundes-Bodenschutzgesetz)	BBodSchG (1999)		Outlines actions to remediate contaminated soil sites and to prevent future contamination. Includes good agricultural practices to be used when working with soil for agricultural purposes. Enacted more specifically at the state level.
German Infection Protection Act (Infektionsschutzgesetz)	IfsG	Pathogens (in water, wastewater, water for human consumption and water for swimming or bathing)	Outlines measures to prevent communicable diseases in humans, detect infections at an early stage and prevent their further spread. Regulates the necessary cooperation and collaboration of federal, state and local authorities, physicians, veterinarians, hospitals, scientific institutions and other stakeholders
Marine Strategy Framework Directive* * see previous section.	MSFD (2008)	Includes pesticides, pharmaceuticals, pathogens.	In Germany, the coastal Länder (Küstenbundesländer) are responsible for implementing the MFSD. Regular reports on the progress of implementation to the European Commission are mandatory. The national cooperation is organized by the Federal-State Committee North Sea and Baltic Sea (BANLO).
Derived tolerance values for selected active pharmaceutical ingredients in drinking water (Abgeleitete Toleranzwerte für ausgewählte Arzneimittelwirkstoffe in Trinkwasser)	-	Active pharmaceutical ingredients	Provides tolerance values of certain non-regulated foreign substances in drinking water, including active pharmaceutical ingredients.
German Antibiotic Resistance Strategy (Deutsche Antibiotika-Resistenzstrategie)	DART 2020	AMR (both from human and veterinary medicine) in general, no specific compounds	Summarises measures to reduce antibiotic resistance through six overarching goals. Explains what progress has been made regarding the reduction of AMR in human and veterinary medicine, and outlines needed future actions. Discusses reporting requirements and databases.

Document Title	Acronym	Pollutants Targeted	Summary
"Stakeholder-Dialogs" – Federal Trace Substance Strategy (Spurenstoffstrategie des Bundes)	-		As a result of multiple workshops, the Strategy includes recommendations for action to reduce discharges of trace pollutants into water bodies. The recommendations focus on mitigation at the source, during the application and also downstream.
National Water Strategy (Nationale Wasserstrategie 2021)	-		The draft strategy lists recommended measures to be implemented in order to ensure adequate and affordable drinking water for Germany by 2050. Part of this strategy is the founding a national trace substance center (under UBA) – the German Center for Micropollutants (SZB) – to improve knowledge on water pollution.

Swedish Regulatory Documents Reviewed

In Sweden, the literature review was focused on **the texts transposing the WFD** into national legislation[3]. They are listed below:

- Environmental Code (1998:808) (*Swedish: Miljöbalk (1998:808)*)
- Water Management Ordinance (2004:660) (*Swedish: Förordning (2004:660) om förvaltning av kvaliteten på vattenmiljön, numer vattenförvaltningsförordning (2004:660)*)
- Ordinance (2017:868) Containing Instructions for the County Administrative Board (*Swedish: Förordning om ändring i förordningen (2002:864) med länsstyrelseinstruktion, upphävd, numer förordning (2017:868) med länsstyrelseinstruktion*)
- Public Water Services Act (1970:244) (*Swedish: Lag (1970:244) om allmänna vatten och avloppsanläggningar, upphävd, ersatt av lag (2006:412) om allmänna vattentjänster*)
- Ordinance on Environmentally Hazardous Activities and Health and Safety protection (1998:899) (*Swedish: Förordning (1998:899) om miljöfarlig verksamhet och hälsoskydd*)
- Geological Survey of Sweden Regulation (SGU-FS 2008:2) on Environmental Quality Standards and Groundwater Status Classification (*Swedish: Sveriges geologiska undersöknings föreskrifter (SGU-FS 2008:2) om statusklassificering och miljökvalitetsnormer för grundvatten, upphävd, numer föreskrifter (SGU-FS 2019:1) om ändring av Sveriges geologiska undersöknings föreskrifter (SGU-FS 2013:2) om miljökvalitetsnormer och statusklassificering för grundvatten*)
- Geological Survey of Sweden Regulation and Reccomendation (SGU-FS 2017:1) on Management Plans and Action Programs for Groundwater (*Swedish: Sveriges geologiska undersöknings föreskrifter (SGU-FS 2008:3) om redovisning av förvaltningsplan för grundvatten, numer föreskrifter och allmänna råd (SGU-FS 2017:1) om redovisning av förvaltningsplaner och åtgärdsprogram för grundvatten)*
- Geological Survey of Sweden Regulation (SGU-FS 2013:1) on Mapping and Analysing Groundwater (*Swedish: Sveriges geologiska undersöknings föreskrifter (SGU-FS 2013:1) om kartläggning och analys av grundvatten*)

[3] https://eur-lex.europa.eu/legal-content/SV/NIM/?uri=CELEX:32000L0060

French Regulatory Documents Reviewed

Table 7. List of French regulatory documents reviewed.

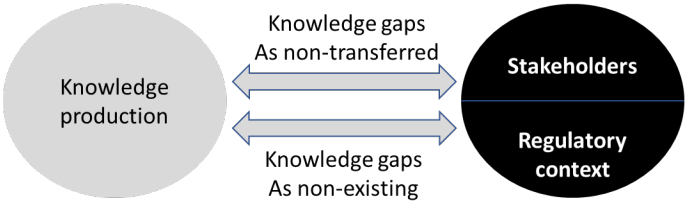
Title	Summary	Link
Arrêté du 02/02/98 relatif aux prélèvements et à la consommation d'eau ainsi qu'aux émissions de toute nature des installations classées pour la protection de l'environnement soumises à autorisation	Order setting the obligations of Owner / manager of the of equipments listed under the environment protection regulations; wastewater operating conditions; spreading conditions of waste or wastewater on farmland; risk managements plans and emergency plans.	https://aida.ineris.fr/reglementation/arrete-020298-relatif-prelevements-a-
Instruction du 04/03/02 relative à la lutte contre la pollution du milieu marin (documentation nationale POLMAR)	Action plan against pollution of the marine environment. Defines roles and responsibilities among the State services. Three types of measures: prevention, preparedness, protection	https://aida.ineris.fr/reglementation/instruction-040302-relative-a-
Arrêté du 22/09/08 relatif à la fréquence d'échantillonnage et aux modalités d'évaluation de la qualité et de classement des eaux de baignade	Sampling and assessment methods for the evaluation of the quality of bathing waters Definition of good quality (criteria)	https://aida.ineris.fr/reglementation/arrete-220908-relatif-a-frequence-dechantillonnag
Arrêté du 17/12/08 établissant les critères d'évaluation et les modalités de détermination de l'état des eaux souterraines et des tendances significatives et durables de dégradation de l'état chimique des eaux souterraines	Evaluation criteria for the chemical status of groundwater Description of steps to determine the threshold values. Stricter values can be fixed in the RBMP.	https://aida.ineris.fr/reglementation/arrete-171208-etablissant-criteres-devaluation-modalites-
Arrêté du 17/07/09 relatif aux mesures de prévention ou de limitation des introductions de polluants dans les eaux souterraines	Measures to limit or prevent pollutants in groundwater. Lists of substances are established. Substances can be added at RB level (via the RBMP). All substances that are already banned from marketing or use are de facto forbidden. Lists of derogations.	https://aida.ineris.fr/reglementation/arrete-170709-relatif-mesures-prevention-limitation-introductions-
Arrêté du 12/01/10 relatif aux méthodes et aux critères à mettre en œuvre pour délimiter et classer les masses d'eau et dresser l'état des lieux prévu à l'article R. 212-3 du code de l'environnement	Implementation of the WFD	https://aida.ineris.fr/reglementation/arrete-120110-relatif-methodes-criteres-a-
Arrêté du 08/07/10 établissant la liste des substances prioritaires et fixant les modalités et délais de réduction progressive et d'élimination des déversements, écoulements, rejets directs ou indirects respectivement des substances prioritaires et des substances dangereuses visées à l'article R. 212-9 du code de l'environnement	List of priority substances + timeframe (20 years) + conditions for reducing or banning their release in the environment	https://aida.ineris.fr/reglementation/arrete-080710-etablissant-liste-substances-prioritaires-fixant-modalites-delais
Note du 27/04/11 relative aux adaptations des conditions de mise en oeuvre de la circulaire du 05/01/09 relative aux actions de recherche et de réduction des substances dangereuses dans les rejets aqueux des IC	Based on the annual reports from the owner of the ICPE, this note helps decide which measures to take or which substances to prioritise for further monitoring. Note addressed to the inspection of ICPE.	https://aida.ineris.fr/sites/aida/files/fichiers/doc_7290_1.pdf
Circulaire du 07/07/11 relative aux modalités de mise en oeuvre par les préfets des mesures de gestion dans le cadre du plan national d'actions sur les polychlorobiphényles (PCB)	Measures following the detection of PCB in fishes. PCB have been monitored from 2008 to 2010 (along with dioxins and mercury).	https://aida.ineris.fr/reglementation/circulaire-070711-relative-modalites-mise-oeuvre-prefets-
Arrêté du 02/05/13 relatif aux définitions, liste et critères de la directive 2010/75/UE du Parlement européen et du Conseil du 24/11/10 relative aux émissions industrielles	Definition of best techniques available List of pollutants of water (families) including WFD lists	https://aida.ineris.fr/reglementation/arrete-020513-relatif-definitions-liste-criteres-directive-

Title	Summary	Link
Arrêté du 07/09/15 modifiant l'arrêté du 07/07/10 établissant la liste des substances prioritaires et fixant les modalités et délais de réduction progressive et d'élimination des déversements, écoulements, rejets directs ou indirects respectivement des substances prioritaires et des substances dangereuses visées à l'article R. 212-9 du code de l'environnement	Update of the list of priority substances and hazard substances	https://aida.ineris.fr/reglementation/arrete-070915-modifiant-larrete-8-juillet-2010-etablissant-liste-substances
Instruction n° DGS/EA4/2015/356 du 04/12/15 relative à la gestion des risques sanitaires en cas de dépassement de la limite de qualité pour la somme des concentrations en tétrachloroéthylène et en trichloroéthylène dans les eaux destinées à la consommation humaine	Action plan if threshold values of tetrachloroethylene and trichloroethylene are exceeded in natural waters used for drinking water production	https://aida.ineris.fr/reglementation/instruction-ndeg-dgsea42015356-041215-relative-a-gestion-risques-sanitaires-cas
Note technique du 20/01/16 relative à la mise en œuvre de la liste de vigilance introduite dans la directive 2013/39/UE du 12/08/13 modifiant les directives 2000/60/CE et 2008/105/CE en ce qui concerne les substances prioritaires pour la politique dans le domaine de l'eau	Presentation of the watch list decided at EU level and coordination of action to implement it in 2016-2017	https://aida.ineris.fr/reglementation/note-technique-200116-relative-a-mise-oeuvre-liste-vigilance-introduite-directive
Arrêté du 04/08/17 modifiant plusieurs arrêtés relatifs aux eaux destinées à la consommation humaine pris en application des articles R. 1321-2, R. 1321-3, R. 1321-10, R. 1321-15, R. 1321-16, R. 1321-24, R. 1321-84, R. 1321-91 du code de la santé publique	Update of the quality criteria for drinking water	https://aida.ineris.fr/reglementation/arrete-040817-modifiant-plusieurs-arretes-relatifs-eaux-destinees-a-
Arrêté du 19/10/17 relatif aux méthodes d'analyse utilisées dans le cadre du contrôle sanitaire des eaux	Analysis method for the health control of waters: drinking waters, bathing waters	https://aida.ineris.fr/reglementation/arrete-
Arrêté du 14/01/19 relatif aux conditions de mise sur le marché des produits introduits dans les installations utilisées pour le traitement thermique des eaux destinées à la consommation humaine	Marketing conditions of products used in drinking water production	https://aida.ineris.fr/reglementation/arrete-140119-relatif-conditions-mise-marche-
Arrêté du 15/04/19 relatif au programme d'analyses de la qualité de l'eau et aux limites et références de qualité des baignades artificielles	Definition of quality analysis, protocols and values for artificial bathing waters - depending on temperature and attendance	https://aida.ineris.fr/reglementation/arrete-150419-relatif-
Arrêté du 09/09/19 relatif à la définition du bon état écologique des eaux marines et aux normes méthodologiques d'évaluation	Definition of good status of marine waters and norms to evaluate the status	https://aida.ineris.fr/reglementation/arrete-090919-relatif-a-
Guide de mise en œuvre de la directive sur les émissions industrielles	Guidance to implement the IED Questions / Answers format	https://aida.ineris.fr/sites/aida/files/2021-
Note technique du 29 septembre 2020 relative aux objectifs nationaux de réduction des émissions, rejets et pertes de substances dangereuses dans les eaux de surface et à leur déclinaison dans les SDAGE 2022-2027	National targets (and deadlines) for reducing the discharge of hazardous substances in the aquatic environment, to be included in the RBMP: - 53 priority & hazardous substances by 100% (30% for 7) - other substances used to classify the water chemical status: 10% to 30% reduction by 2027	https://aida.ineris.fr/sites/aida/files/gesdoc/10521 93/Note20200929_BO18 122020.pdf
Plan de surveillance des contaminants chimiques du milieu aquatique dans les produits de la pêche – 2022	Monitoring program of chemical contaminants in the aquatic media via fish products	https://info.agriculture.gouv.fr/gedeopil/site/bo-agri/instruction-2022-
Arrêté du 26/04/22 modifiant l'arrêté du 25 janvier 2010 établissant le programme de surveillance de l'état des eaux en application de l'article R. 212-22 du code de l'environnement	Monitoring program of waters	https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000045780020
Plan national sur les résidus de médicaments dans l'eau	National action plan on residual medical products in waters	https://solidarites-sante.gouv.fr/IMG/pdf/P
MÉDICAMENT ET ENVIRONNEMENT - La régulation du médicament vis-à-vis du risque environnemental (CGEDD, 2010)	Analysis of the lack of regulatory framework on human medicines in regard to the environmental impacts	https://cgedd.documentation.developpement-durable.gouv.fr/documeC/pdf/P

Title	Summary	Link
Un cadre pour conduire une politique de santé animale dans la filière aquacole	Synthesis of current challenges on animals' health in aquaculture and recommendations	https://agriculture.gouv.fr/sites/minagri/files/
COMITÉ INTERMINISTÉRIEL POUR LA SANTÉ - MAÎTRISER LA RÉSISTANCE BACTÉRIENNE AUX ANTIBIOTIQUES - FEUILLE DE ROUTE (2016)	A roadmap to prevent bacterial resistance to antibiotics	https://solidarites-sante.gouv.fr/IMG/pdf/feuille_de_route_antibioresistance.pdf
Plan national de réduction des risques d'antibiorésistance en médecine vétérinaire 2017-2021	Second national action plan to reduce the risks associated to AMR in veterinary medicine.	https://agriculture.gouv.fr/le-ecoantibiotique-et-ses-plans
Deuxième stratégie national sur les perturbateurs endocriniens 2019-2022	Second national strategy to monitor and reduce EDC	https://solidarites-sante.gouv.fr/sante-et-environnement/risques-sanitaires-environnementaux/perturbateurs-endocriniens/article/deuxieme-strategie-nationale-sur-les-perturbateurs-endocriniens-2019-2022
Synthèse des valeurs réglementaires pour les substances chimiques, en vigueur dans l'eau, les denrées alimentaires et dans l'air en France au 30 juin 2020	Bi-annual synthesis of all threshold values applicable in France for food, air and water	https://www.ecologie.gouv.fr/sites/default/files/Rapport-Ineris-200358-2190502_Synthese-des-valeurs-reglementaires-pour-les-substances-chimiques-en-vigueur-dans-l-eau-les-denrees-alimentaires-et-dans-l-air-en-France-au-30-juin-2020.pdf
SDAGE 2022-2027 sur les 6 Agences de l'eau et les DROM	RBMP and associated PoM on the 6 continental RBD	https://www.gesteau.fr/consulter-les-sdage

Deliverable 1.1: Synthesis and Key Demands

Stakeholders and Regulatory Context



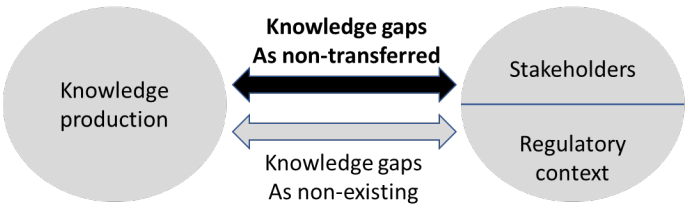
There are many stakeholders involved on the topics of CEC, AMR and water-borne pathogens. Though it is positive that many organisations are concerned with these topics, potentially complementing each other's, it was also found that it dilutes responsibility to tackle the aquatic pollution challenge.

Research institutions, universities, national or regional authorities are well connected through professional networks and via participation in funded research initiatives. Exchanges with local authorities, water suppliers or waste-water services are more limited. Water managers have their own federations in each country as well as representatives at the EU level. The water sector is fragmented in all three countries studied. Cooperation with the private sector is low. There are very few joint initiatives involving the private companies producing or using the pollutant substances. Private sectors also have their dedicated networks. Consultancies or designers of solutions to monitor or remediate the pollution are easier to identify and contact. There is a significant gap between the stakeholders responsible for producing, regulating or using substances, on one side, and the stakeholders involved in the surveillance and management of the water resources, on the other side (different ministry departments or agencies, different research teams, different professional networks, etc.).

CECs are managed at the national level (i.e. decisions on which substances to be monitored, which threshold values are acceptable or not, prioritization of research) following the directives and regulations from the EU. The demands are in constant evolution though, sometimes reacting to pollution accidents or political priorities. On AMR, national working groups exist in Germany, in Sweden and more recently in France.

Strong national regulations are already in place for pesticides and biocides as well as a few known hazardous substances (i.e. bisphenol or metals), but it remains weak for pharmaceuticals, cosmetics or household products. The EU legislation is strongly shaping the national legislations regarding substances regulations or environmental objectives. When new issues emerge, the national authorities wait for the EU to take the lead and negotiate the rules.

Stakeholder Demands: Existing knowledge – Not transferred



There is a wealth of information on aquatic pollutants which is both perceived positively (when one knows what to look for) and negatively (lack of efficiency and risk of redundancy). Key messages are diluted. Centralizing this knowledge and disseminating it more efficiently needs to be improved. Some information might also be available in only one (non-English) language which prevents access by experts from other countries. The delays to publish information is also considered too long to effectively act; early-warning systems are required.

Professional networks have been identified as key to facilitate the transfer of knowledge, as they provide easier access to experts, offer trainings and seminars, produce newsfeeds on new regulations, research results or technological innovations, foster partnerships for research projects and sometimes manage their own databases. National agencies are also central to provide guidance for the implementation of national or European regulations, share returns of experiences and disseminate good practices. They have the capacity to tailor information to the end-users' needs.

Professionals also rely on specialised reviews or newspapers, scientific literature, state-of-the-art reviews from PhD students, official websites as well as social media to access recent information about aquatic pollutants.

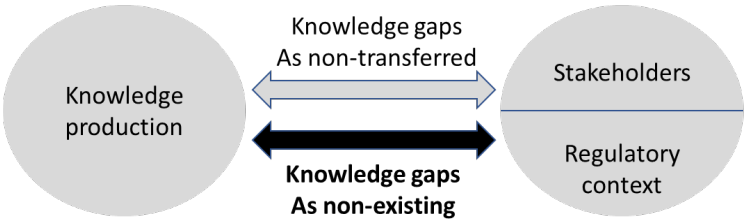
Communication remains difficult in between the categories of actors involved. Emitters of aquatic pollutants tend to be conservative of their data or methodologies. Researchers are precautious when discarding results. Policy makers would need more operational solutions and straightforward answers before taking action. Communication can even be difficult among State authorities (different ministries).

A specific demand from the public sector relates to data sharing for the registration process of substances, making better use of digitalisation tools. This information would allow for better risk assessments (as the managers of the natural resources would have better knowledge of which substances might possibly be present in the environment) and quicker regulation of substances (if toxicity or accumulation effects are demonstrated).

There is also little monitoring about the real uses of substances for human activities (pollution pressure) and the exposure pathway to the environment.

Knowledge transfer and reporting requirements for water stakeholders are not specified by the national legislations in France or Germany, though centralised databases have been developed in both countries at the initiative of national research institutes or State agencies. There are several public databases on AMR, biocides and further hazardous substances including endocrine disruptors, pharmaceuticals or pesticides in Germany. In France, the databases have been set for each environment (soils, surface waters, groundwater, drinking water, etc.) with information on chemical substances as well as other parameters (physical, biological). Strategy papers emphasize the importance of knowledge transfer and the need to improve access to data concerning emerging pollutants.

Stakeholder Demands: Knowledge Gaps



Knowledge gaps have been reported concerning measuring, analysing and characterizing substances in aquatic systems. The monitoring systems for chemicals in waterbodies are already quite functional in all three countries though there is still room for improvement (better geographical coverage, harmonisation of protocols to allow for comparative studies, quicker reporting, …). There is also a need to define common assessment parameters and indicators, as well as to expand analytical methods to detect substances at low concentrations (passive samplers) and new chemicals/substances (non-target analysis methods). There are no specific protocols yet in place to monitor AMR processes in the environment.

Knowledge gaps have been reported on the information pertaining to hazardous substances (PFAS at the top of the list), toxicity of compounds mixture, influence of physical parameters on the becoming of chemical pollutants (accounting for climate change), transport of pollutants (through modelling), AMR detection and impacts, microplastics and nano-plastics. There is no database yet to retrieve information about the presence of antibiotics in the environment, or the monitoring of micro- and nano-plastics at the European scale. Behaviour of pollutants in the environment, especially the marine waters or groundwaters, also needs to be more deeply investigated.

Developing better treatment (ozonation, activated carbon, nanofiltration) techniques is also an on-going quest in all countries, adopting a more comprehensive approach that looks at the entire pollution chain. The efficiencies of the technologies shall also be assessed under a variety of conditions to demonstrate added-value and applicability throughout Europe (and facilitate their uptake and approval). Mitigation techniques or infrastructures (sewage overflow prevention, nature-based solutions, separated water networks, etc.) also require innovation and replication, taking into account the need to reduce (water and energy consumption), reuse and recycle chemicals. Social drivers and behavioural change are also new fields to investigate to accompany the above development trends.