EUROPEAN WATER FRAMEWORK DIRECTIVE 2000/60/EC

ROOF REPORT OF THE MANAGEMENT PLAN FOR THE INTERNATIONAL SCHELDT RIVER BASIN DISTRICT

REVISED VERSION – 07/06/2015

This document presents the Roof Report of the Management Plan for the International Scheldt river basin district and it is meant to give further effect to the European Water Framework Directive. For further completion, items from the underlying national or regional parts of the Management Plan will be added. These complements will not modify the national or regional plans.

DRAFT

Foreword

Dear reader,

This is the Roof Report of the second Management Plan (RRMP) for the international Scheldt River basin district in the context of the Water Framework Directive EC/2000/60 (WFD). It constitutes a complement to the management plans of the national and regional parties (France, Federal Belgium, the Walloon Region, the Flemish Region, the Brussels Capital Region and the Netherlands).

This RRMP is the result of the international coordination ensured by the International Scheldt Commission’s contracting parties. For this purpose, a planning and coordination process needed to be developed, both on a district scale and on either side of the Parties’ borders, and also with the roof report of the flood management plan, in order to ensure optimal coherence and continuity in the Scheldt district. Numerous meetings were held in a period of two and a half years, entailing sometimes tough discussions to finalize this report. That is why we wish to express our sincere thanks to all delegations involved for their commitment, their input, their patience and their support.

This document fits in with the Water Framework Directive’s logic. It is composed of ‘bricks’, tools, reports, memorandums, files, maps resulting from the coordination and its added value. The RRMP is based on the update of the state survey. Based on it and on those of the ISC Parties, the water management issues were updated on a Scheldt district scale, and the RRMP is an attempt to meet these. The coordination of the monitoring is illustrated by the update of the Scheldt Homogeneous Monitoring Network and the preparation of the three-yearly report on water quality 2011-2013 as a complement to the new state survey; the coordination of all border water bodies has been reinforced, both for surface (fresh water, coastal and transitional water) and groundwater, thanks to the use of standard coordination files; furthermore, joint measures, taken or to be taken, have been developed for every management issue.

This roof report shows that the situation for each of the Parties on both sides of borders is taken into account in the preparation of the national / regional plans, yet that approaches sometimes differ and even diverge. In order to achieve the good status of water bodies faster and more efficiently in a district where pressure has been historically high, joint measures have been elaborated.

This plan also constitutes a starting point for future multilateral consultations, to tackle joint problems such as the reduction of nitrate or the unrestricted movement of fish in the context of ecological continuity of water courses, and to adapt to all the effects of climate change.
We hope that by reading this plan, you will be convinced of the fact that, for every delegation, the improvement of the ecological quality of the Scheldt district’s waters and the sustainable protection of water resources, sometimes locally but also coordinated on an international and interregional scale, remains a major challenge.

Paul Raoult
Chairman of the ISC

Table of contents
1. Introduction
   1.1 Context: legal and organizational framework
   1.2 Steps in the planning process
   1.2.1 Timing
   1.3 Transboundary cooperation (Mapping support)
      1.3.1 The ISC's work organization
      1.3.2 Bilateral coordination: outlines/files bilateral coordination
      1.3.3 Mapping
2. Presentation of the international Scheldt river basin district
   2.1 Updating the art. 5 analyses
      2.1.1 Introduction
      2.1.2 General description of the international Scheldt river basin district
      2.1.3 Pressures/impacts on surface and groundwater
      2.1.4 Economic analysis
   2.2 Climate change
   2.3 The district’s important water management issues
      2.3.1 Surface water quality, hydromorphological modifications
      2.3.2 Vulnerability of groundwater
      2.3.3 Reinventing water culture
      2.3.4 Coastal waters
      2.3.5 Economic analysis
      2.3.6 Flood control
      2.3.7 Managing drought effects
      2.3.8 Effects of climate change on “fresh water ecosystems” and various ways to use water
      2.3.9 Governance
      2.3.10 Data, measuring methods and assessment methods
   2.4 Coordination when characterizing water bodies
      2.4.1 Transboundary aquifers
      2.4.2 Common types of surface water
      2.4.3 Designation of strongly modified water bodies
3. Monitoring and assessment of the situation
   3.1 Groundwater
      3.1.1 Monitoring networks
      3.1.2 International coordination of chemical and quantitative status assessments of groundwater bodies
   3.2 Fresh surface water
      3.2.1 The Homogeneous Monitoring Network Scheldt (HMNS)
      3.2.2 International coordination of chemical and quantitative status assessment of fresh surface water bodies
   3.3 Coastal and transitional waters
      3.3.1 Monitoring networks
3.3.2 International coordination of chemical and quantitative status assessments of coastal and transitional water bodies

4. Coordination of environmental objectives
4.1 Environmental objectives for groundwater bodies in transboundary aquifers
4.2 Environmental objectives for fresh surface water
4.2.1 Biological quality elements
4.2.2 Physico-chemical quality elements (parameters contributory to biology and Scheldt-specific substances)
4.2.3 Assessment of the good ecological status: Comparison of (draft) standards
4.2.4 Hydromorphological quality elements contributory to biology
4.2.5 Determining the good ecological potential (GEP)
4.3 Environmental objectives for coastal and transitional waters
4.3.1 Fixing objectives for the ecological status
4.3.2 Reaching the good ecological status in 2021 – assessment
4.3.3 Reaching the good chemical status in 2021 – assessment
4.4 Coordination of derogations
4.4.1 Bilateral coordination of derogations
4.4.2 Coordinated analysis of disproportionate costs

5. Coordination of the programs of measures
5.1 Main measures selected by the parties for each of the water management issues
5.2 Joint measures to deal with water management issues
5.2.1 Achieving quality surface waters
5.2.2 Protecting groundwater
5.2.3 Reintroducing water culture
5.2.4 Improving coastal water quality
5.2.5 Analyzing the measures’ cost-efficiency
5.2.6 Flood control
5.2.7 Minimizing drought effects
5.2.8 Assessing the consequences of climate changes on “fresh water ecosystems” and on various water uses
5.2.9 Improving transboundary governance
5.2.10 Data, measuring methods and assessment methods
5.3 Analysis of the measures’ cost-efficiency
6. Register of protected areas
6.1 Water intended for human consumption
6.2 Nitrate and urban waste water
6.3 Birds and habitat
6.4 Fish and shellfish water
6.5 Bathing areas
7. Information and consultation of the public
7.1 Public participation: every party’s competence
7.2 Coordination at the International Scheldt Commission
7.3 Results of transboundary coordination

LIST OF MAPS
LIST OF TABLES
LIST OF ATTACHMENTS
LIST OF ABBREVIATIONS
1. Introduction

The European Water Framework Directive (WFD) calls for every river basin district’s management plan to be reviewed by 2015 so as to establish a second coordinated management plan. The international Scheldt treaty’s member states/regions (Treaty of Ghent – 3/12/2002) decided that the International Scheldt Commission would be the consultation forum for the implementation of the WFD and of the directive having regard to flood risk assessment and management 2007/60/EC (FRD) in the international Scheldt river basin district (DISTRICT). This is why the contracting parties decided unanimously to jointly work out two management plans: one related to the WFD and one related to the FRD. These plans consist of a roof report and the national and regional sections (see attachment 1).

The Roof Report of the second management plan (RRMP) gives a picture of the added value as a result of the coordination between the ISC parties. It is far more than a survey on a Scheldt District scale, namely a transboundary view shared at the ISC and it responds to the water management issues of common interest.

1.1 Context: legal and organizational framework

In 2000, the European Parliament and the European Council adopted the WFD (2000/60/EC), which establishes a framework for a Community policy having regard to water.

This directive asks that every Member state shall ‘provide for such a framework and coordinate and integrate, and, in a longer perspective, further develop the overall principles and structures for protection and sustainable use of water in the Community in accordance with the principles of subsidiarity. In the case of an international river basin district falling entirely within the Community, Member States shall ensure coordination with the aim of producing a single international river basin management plan (IRBMP).’ (art. 13, paragraph 2).

Every country or region continues to be responsible for the implementation within their own territories. Nevertheless, coordination among riparian states or regions of the Scheldt meant to improve the water quality already existed earlier thanks to the international treaty for the protection of the Scheldt, dated 1994 (Charleville-Mézières treaty).

In 2002, the Treaty of Ghent mainly formalized the multilateral coordination at the ISC of the WFD implementation in the Scheldt district (articles 2 and 4).

The international Scheldt river basin district (Scheldt district) covers the Scheldt river basin along with the Yser, Somme (FR), AA (FR), Canche (FR) basins, the Dunkirk polders (FR) and the Bruges polders (VL) as well as the Grevelingenmeer (NL) (Map C1.1).

The Treaty of Ghent also regulates the international coordination of the FRD, as well as the advice or recommendations to be elaborated in order to mitigate drought effects.

Since the first roof report of the status survey was made up, coordination at the ISC has been founded on “bricks” – tools allowing more concrete and more local coordination, more closely linked to the program of measures and their effects.

This way, the ISC’s contracting parties developed a bilateral coordination scheme for all surface water bodies located at the border, for the district’s transboundary aquifers and for transboundary watercourses with regard to flood risks and severe low-flows.

The homogeneous monitoring network of the Scheldt (HMNS) has been entirely reviewed, on the one hand to adapt to the WFD’s quality surveillance requirements, and on the other hand to provide a coordinated picture of the water quality of the Scheldt district’s main transboundary watercourses. Thanks to a three-yearly quality report on the Scheldt district covering 2011 to 2013, based on this
second generation HMNS’s results, and to yearly reports on water quality, fluctuations in the WFD parameters’ concentrations and in Scheldt-related substances could be examined more profoundly. The memorandum about the reduction of nitrate originating from agriculture provides an overview of the exchanges that took place at the ISC.

For the first time ever in the Scheldt district, a Master Plan Fish takes stock of the migrating fish populations in the district, the existing pressure on ecological continuity (free fish migration) and measures for improvement.

A first strategic memorandum on adaptation to climate change was made up. More district-wide maps were produced and the warning and alarm system against accidental pollutions turned digital.

In addition, the ARR made up in 2004 was revised and summarized. New water management issues on a Scheldt district level were approved. And last but not least, the implementation of the Interreg project ScaldWIN at the ISC allowed to reinforce consultations by taking a number of pilot actions in response to some existing difficulties in the district.

All of this makes up the roof report of the second Scheldt district management plan (RRMP) which is focused on the coordination of the present and future water management of the various Parties.

Map C1.1: Authorities competent for the WFD’s implementation in the Scheldt district

The map outlines the Scheldt district’s competent authorities (see attachment 2). On Belgian territory, coastal waters are the federal authority’s sole competence, the rest of the territory being the regions’ authority.

1.2 Stages in the planning and implementation process
1.2.1 Timing

One of the WFD’s innovations is to determine a detailed long term planning for its implementation by the member states, who may implement it more rapidly at their own discretion. Within the framework of the treaty of Ghent and for the elaboration of the RRMP, all Parties took into account each other’s timing and adapted, if so required, their own management plans according to the analyses’ results and the consultations of other stakeholders.

As a consequence, it has been agreed within the ISC to adhere to the WFD timing as a guiding principle for the international coordination.

The international implementation of the FRD runs parallel and is closely linked to the DCE.

1.3 Transboundary cooperation
1.3.1 The ISC’s working organization

The ISC is an intergovernmental body that carries out the missions defined in article 4 of the Ghent treaty. One of these is “the multilateral coordination when implementing the WFD requirements regarding subjects of common interest”. These activities follow a common plan of work in which the deliverables are listed. Experts representing the respective Parties cooperate in project groups.

From 2003 to 2015, the ISC secretariat organized over 1,000 meetings, and the working organization was adapted to the various paramount WFD stages, the way the Parties did when implementing the WFD within their own territories.
To elaborate the following documents, three consecutive types of working organizations were put in place from 2003 to 2015:

- The WFD ARR (2004) and the water management issues (2005)
- The first WFD RRMP (2009) and the Interreg project Scaldit
- The second WFD RRMP, including the new water management issues (2014), related to the Interreg project ScaldWIN and the first FRD RRMP (2015).

The latter working organization aims at a more multidisciplinary approach, which is not only meant to achieve a better exchange in terms of working methods and objectives among the Parties, but also to increase the coherence between the programs of measures.

1.3.2 Bilateral coordination: schemes, filing cards

To ensure better coherence on both sides of the border and a higher efficiency of the Parties’ programs of measures, we need to be aware of each other’s knowledge and insights. This is why the Parties at the ISC have made up a number of schemes/filing cards for bi or trilateral coordination.

For the WFD, these documents mainly include for every borderline (surface and ground) water body (see attachment 4):

- Their characterization (description and location);
- Their chemical and ecological status (surface water) and the quantitative and chemical status (groundwater);
- Their environmental objectives;
- The relevant programs of measures

In the context of the international coordination of the FRD at the ISC, a number of filing cards on the transboundary watercourses have been elaborated (see attachment 6.1 FRD RRMP).

1.3.3 Cartography

Beside the national reporting and the information gathered for the EU, cartography on a district scale is the main tool to perform a transboundary analysis and ensure the coordination of maps.

Yet, for this district, 3 different coordinate systems coexist. Moreover, the way the geographical data are stored, as well as every party’s own approach, are two aspects that complicate continuity and the definition of transboundary areas.

As a result, the “Cartography” project has been improving coherence and normalizing the data since the implementation of the WFD in the Scheldt district was launched by means of international coordination. Based on traceable data sources and on a common frame of reference, in accordance with the “Inspire” directive (ETRS89), harmonized maps were made up.

All the maps in this document help to illustrate this work. They can be found on our website: http://carto1.wallonie.be/webgis.escaut.escaut.public/viewer.htm (see the map list).

2 Presentation of the international Scheldt river basin district

2.1 Updated status analysis (art. 5)

2.1.1 Introduction

According to art. 5 of the WFD, the Scheldt district’s states and regions must review every 6 years the analyses carried out in 2004, and for a start in 2013. Case need, they must update them for the district’s section on their territories. These updated analyses need to contribute to the elaboration of the programs of measures and of the river basin district management plans of the second cycle, meant for the WFD’s implementation.
These analyses entail:
- The district’s characterization;
- An assessment of human activities’ influence on the status of surface and groundwater (pressure and impact analysis);
- An economic analysis of the water usage.

As it was the case for the first management plans, the various states and regions making up the international Scheldt district exchanged at the ISC the information that they have on their respective district sections.

For the several points discussed hereafter, we refer, insofar as there are no significant changes in comparison with the first WFD cycle, to the roof report ‘Status survey’, published by the ISC in 2005 and available on: ODA-PFEL rapport_fr_def (which hereafter is called ‘Report 2005’ (see attachment 6.2).

2.1.2 General description of the international Scheldt river basin district

Map C2.1.2: the Scheldt district’s important watercourses

Map C2.1.2 presents the Scheldt district’s important watercourses. The Scheldt and its tributaries are lowland watercourses with low flows that used to run off in large floodable plains and form meanders. A major part of these have been straightened and canalized for a better protection against floods and to reinforce navigation. These interventions strongly affected certain watercourses’ natural character.

I Physical geography
No relevant change is to be reported. We refer to the Report 2005.

II Climate
The temperature averages linked to a 30-year period, recorded from 1981 to 2010 in Uccle’s weather station, are higher than those referring to the period 1961-1990, mentioned in the Report 2005: 3.3 °C against 2.5 °C in January (the coldest month) and 18.4 °C compared to 17.2 °C in July (the warmest month). These recorded differences correspond to the climate scenarios predicting climate change.

As for precipitation, the average annual volume for the period 2007-2013 amounted to 858 mm, against 820 mm reported in 2005.

III Geology and hydrogeology
No relevant change is to be reported. We refer to the Report 2005.

IV Hydrology
In 2013, the hydrology of the Scheldt’s watercourses remained perfectly comparable with the status reported in 2005.

For the period 2001-2013, yearly average flows show a fairly constant progress, with an average of 118 m³/s in Schelle (standard deviation being 32 m³/s), and an average of 58 m³/s in Rupelmonde (standard deviation being 10 m³/s).

Likewise, the recorded five-days maximum flows show a stable progress during the period 2001-2013. As for the flows of the Maritime Scheldt in Schelle, the recorded five-days maximum flows
varied from 287 to 764 m²/s. For the Rupel, the five-days maximum flows varied from 144 to 292 m²/s. The 2013 values always remained within these ranges, with a maximum five-days average value of 426 m²/s in the Maritime Scheldt and 163 m²/s in the Rupel for the year 2013.

The same observation was made in regard of the minimum five-days average flows. Their progress in the period 2001-2013 remained stable.

As for the flows of the Maritime Scheldt in Schelle, the recorded minimum five-days average flows varied from 28 to 60 m²/s. For the Rupel, the minimum five-days average flows varied from 36 to 16 m²/s. The values for 2013 always remained within these respective ranges, with a minimum five-days average value of 33 m²/s in the Maritime Scheldt and 17 m²/s in the Rupel for the year 2013.

V Land use

Land use in the Scheldt district has not changed a lot over the past decade. The urbanization rate has increased to the detriment of farmland and forested areas. The large industrial zones are located on the outskirts of large urban centers or harbor areas.

Vi Tidal influences

Typical for the washes of the Scheldt estuary, which extends from Ghent, at the upstream edge, up to the Raan Plain on the downstream side, are the variations in water levels and flows which in turn cause sediment transport, morphology and the fauna and flora’s habitat to change. The foremost variation in water levels is caused by the tide, which enters the estuary from the North Sea. On the upstream side (up to the neighborhood of Dendermonde), fresh water flows have a strong influence as well.

Since the Middle Ages, a number of developments are to be noted: the tide is penetrating deeper into the estuary and the spread between high and low water levels is widening gradually. This evolution has also led to increasing flows/volumes in low and high tide. However, as a result of a changing morphology (f.i. ‘wider’ channels), flow rates have not increased proportionally.

This evolution is to be partially attributed to natural developments within and outside the system, yet it is, to a greater or lesser extent, influenced by human interventions: land reclamation in the last few centuries, dredging of sediments, dredging efforts to make the Scheldt ports more accessible, and hard constructions to separate landside and waterside more clearly since last century. Upstream drainage also varied over time, although these variations are rather limited and they do not follow a particular trend.

These developments confronted and will confront the administrators with a number of challenges, one of these being the rising sea level, which is a major discussion point, namely for flood protection. In the last few years, knowledge of the system has been improving (cf. LTV O&M), while further efforts will equally be undertaken.

This knowledge is also applied in practice. In 2010, for example, a new dumping strategy (‘on the edge of sandbanks’) was applied in the Western Scheldt, the dredged sediment being used to create potentially valuable ecological habitats. By doing so, the channel’s broadening could go along with ecological benefits, while avoiding to expose the tide to negative effects. A second example refers to the areas with a lower tidal volume (“ALTV”) which are built against the background of the updated Sigma plan. These areas reinforce flood protection, on top of their new function as a nature reserve.
In the forthcoming years, steps will be taken to further investigate how to anticipate optimally on future challenges such as the rising level, f.i.. by means of the sediment management strategy.

Vii Population and human activities in the Scheldt district

vii-1 Population

In 2011, the Scheldt district had 13.5 million inhabitants, so 5% more than in 2000. Due to its population density of 370 inhabitants/km², the Scheldt district is one of the European Union’s most densely inhabited areas.

Map C2.1.2 vii-1: population density of the Scheldt river basin district

Population growth is not the same for every Party. In Brussels, for example, it rose to 18.7% between 2002 and 2011, and only 0.8% in Zeeland.

Graph 2.1. Increase, in terms of percentages, of the population in the Scheldt district’s regions, between 2000 and 2011.

Every State’s comparative share has slightly evolved: 44% for the Flemish region, 35% for France, 9% for the Walloon Region and 8% for the Brussels Capital Region, and barely 3% for the Netherlands.

Graph 2.2. Every State’s comparative share in the total population.
This information is complementary to what is provided by the 2005 report, which remains relevant. The district’s major metropolises are Lille and the Brussels Capital Region, which had over 1 million inhabitants in 2010, and Antwerp where almost half a million inhabitants lived.

vii-2 Industry

Compared to 2005, developing industrial activities are to be noted along the waterways, one of them being the Albert Canal. Some sectors are on the decline, such as the metallurgical industry and the textile industry. Chemical industry, on the other hand, is growing. Reference is made to the 2005 Report.

vii-3 Agriculture

A slight decrease of the utilized agricultural area is being observed, as well as changes in the types of farms (see chapter 3.3). See also the 2005 Report.

In the Brussels Capital Region, agriculture is almost inexistent.

Since 2009, the agricultural area has increased by 4 per cent only in the Flemish Region. In the other regions, the agricultural area has however gone down, varying from 0.4 per cent in the Brussels Region to 3 per cent in the Netherlands and the Walloon Region. In total, the agricultural area has diminished by almost 1 per cent.

Agricultural activities exert strong pressure on the use of nutrients and pesticides.

C2.1.2_vii-3a- Map Utilized agricultural area for 2004 and 2012

Livestock

Cattle (-5%) and poultry (-11%) have decreased. The number of pigs, however, has gone up (+ 3.5%), notably in the Flemish Region.

C2.1.2_vii-3b – Map: livestock evolution in the district

vii-4 Tourism and recreation

As regards coastal tourism, no relevant change is to be reported. Reference is made to the 2005 Report. River tourism registered 8,000 passengers in 2011. This went down by some 20%.
The main types of water tourism and recreation are:

- Boat trips,
- Renting pleasure boats
- Cruise ships.

**vii-5 Transports**

The Scheldt district is characterized by a dense traffic route network (railways, waterways and roads), and it constitutes a junction of European connections. This network is one of Europe’s densest.

The Scheldt plays an important role in navigation. Upstream of Ghent, the river has been canalized. In the Scheldt district, numerous waterways connect and cross the river basin districts and sub-basins.

A number of important ports of the Hamburg-Le Havre range are located in the Scheldt district:

Le Havre, Dunkirk, Antwerp, Zeebrugge, Ghent. Other sea ports are : Calais, Brussels, Ostend, Flushing, Terneuzen.

A deep channel in the Western Scheldt allows vessels to get access to the port of Antwerp. In comparison with 2005, the yearly tonnage of goods shipped from Antwerp showed a strong increase up to 190 million tons. The port of Antwerp remains Europe’s second port. It is the largest general cargo port and the second largest container port in Europe. 800,000 tons of goods, 70% of which have Antwerp as their final destination, are forwarded yearly via the French inland waterways. This amount could very well increase by the construction of the Seine-Northern Europe canal.

Furthermore, the Antwerp port area is, after Houston, the world’s largest petrochemical complex.

**2.1.3 Pressure/impact on surface and groundwater**

In its article 5, the Water Framework Directive requires the ‘influence of human activities on the status of ground and surface water to be studied’.

**I Generalities**

The coordination mainly focused on the exchange of information in order to map the evolution of pressures between 2004 and 2013.

All Parties identified and estimated pressures by means of the DPSIR approach (Driving Forces – Pressures – State – Impact – Response). Three important driving forces were identified: population, industry and agriculture. The trade and service sector was categorized in the driving force Population.

With respect to the international coordination, the results of the pressure analysis were grouped per cluster of hydrographic units. By doing so, 32 hydrographic units were joined into 13 clusters.

Map C2.1.3 i: Hydrographic units and clusters

**ii Domestic pressure**

Table T2.1.3 ii and map C2.1.3 ii

The map and the table both illustrate the evolution between 2004 and 2012 of the population’s share whose waste water was connected to and treated by a collective wastewater treatment plant.
Thanks to the implementation of the Urban Wastewater Directive, this evolution is quite positive in all of the District’s hydrographic units.

### Industrial pressure

In the Scheldt river basin district, there is quite some industrial activity. This industrial activity may influence the surface waters’ quality as a result of wastewater discharge. This wastewater is either discharged directly into the watercourse or indirectly through a sewer system. Most of this discharge is treated in a wastewater treatment plant before ending up in the surface water.

Furthermore, industrial activities may just as well have an indirect impact on the surface water quality by atmospheric deposits of substances that had been emitted into the air.

The nature of the substances expelled through industrial activities varies considerably. Beside organic matter and macro-pollutants such as nitrogen and phosphorus, harmful substances such as heavy metals and PAHs are to be found.

Map C2.1.3 iii

The map shows, for every sub-basin in the Scheldt river basin district, the spread of industrial sectors discharging directly into surface waters. In order of importance, the district’s industrial sectors are related to food, beverages and tobacco, materials (other industries), metals, paper and cardboard, followed by textile, energy and finally chemicals (including oil refineries).

The sub-basins where the highest amount of companies discharge directly into surface waters are the Deûle-Marque basin in France and the Senne basin in the Brussels Capital Region. This amount is however not necessarily representative for the total load discharged. That depends on the amount of load discharged per company, which may vary substantially. Moreover, the impact depends on the receiving waterway’s flow.

The relative share of industry’s nitrogen and phosphorus discharges seems to be limited in most sub-basins. In most river basins, phosphorus and nitrogen discharges by industry are decreasing.

In the Scheldt river basin district, the Flemish Region is where industry is the most widespread. Nevertheless, considering the industrial discharges, it must be said that oxygen scavengers’ and nutrients’ share is rather limited. The same goes for PAHs.

In the Brussels Capital Region, the tertiary/services sector is the biggest one, its wastewater being comparable to the population’s. Its primary sector is quite limited and the secondary sector represents about 15% of all enterprises, of which only 4-5% are industry and 10% are companies in the construction sector. The main industrial sectors are the chemical industry, the metallurgical industry, printing businesses, the food industry, the textile industry, waste treatment and the paper industry. The only pollutants from industrial sources to be found there are mainly nickel (the automotive industry, laboratories and laundries) and cadmium (laboratories and laundries).

### Pressure originating from agriculture

**Nutrients**

Table T2.1.3 iva

Table T2.1.3 ivb

Table T2.1.3 ivc + maps C2.1.3 iva and C2.1.3 ivb

The changing agricultural surface has no direct influence on the net changes in net nitrogen and phosphorus emissions of agricultural origin. The major decrease is to be noted in the Walloon Region
(25-35%). In the Netherlands, the decrease was about 10%. In most areas in the Flemish Region, the average decrease was 15-20%, yet a slight increase could be noted on a local level.

As for France, nitrogen pressure from agriculture was quite high. It is estimated to be 28.6kTN for the Artois-Picardie basin, which comes down to 79% of the total estimated nitrogen volume. With regard to the French data, the NOPOLU model was used on a national scale in order to estimate nitrogen pressure. This model is utilized by SOeS (the former IFEN) on account of the basins. It enables the calculation of nitrogen surpluses of agricultural origin.

The model’s precision level does not allow a conversion into a water body scale of the estimated agriculture-related nitrogen. The model seems to rather overestimate organic nitrogen and underestimate mineral nitrogen, which complicates a comparison between regions.

Yet the basin-scaled figures that we received allow us to have an idea of how the size of agricultural pressure relates to industry and household-related pressure for that parameter (source: Analysis Nord-Artois-Picardie 2013).

Agriculture in the Brussels Capital Region, located in the international Scheldt river basin district, is not a major activity, so pressure on the quality and quantity of the (surface and ground)water bodies is not significant. On the BCR’s territory, the total agricultural area is 268 hectares, which is 1.6% of the territory. It is mainly located in the towns of Anderlecht, the City of Brussels and Jette, in the western part of the region.

Generally speaking, net phosphorus emissions have dropped, except for the Netherlands where a slight increase can be seen. The major decrease of net emissions applies to the Walloon Region (25-35%), and a bit less for the Flemish Region (5-15%). As for France, it is assumed that agriculture is not the main source of phosphorus.

Phosphorus supply from agriculture is however hard to estimate, since not all parties have a clear idea of phosphorus supplies in their soils, so that potential phosphorus penetration from the soil into surface and groundwater is not precisely known.

Pesticides
Agriculture is also an important source of pesticides. For the impact assessment of agricultural pesticides, it would be of interest to have information about how many tons of the respective substances have been used. As these indicators are not available in the entire district, the exerted pressure can only be described by considering their concentrations measured in the Scheldt district’s surface waters and the frequency at which each Party’s own standards are exceeded.

The ban on a number of active substances such as diuron, dichlorvos, atrazine, endosulfan, parathion and malathion has contributed to improvement, which however needs to be refined as new substances appear replacing others or others continue appearing, such as isoproturon, the quality standards of which are exceeded more frequently or less frequently according to the Party. In Flanders and Wallonia, standards are exceeded in 7 to 10% of the measuring points: the background value at the other points can however remain close to the standard. In the Netherlands, the standard is exceeded at all points.

Other pesticides exceed standards to a higher or a lesser degree for one or several Parties in the international Scheldt district: carbendazim, chloridazon, chlorpyrifos, difludenican, dithiocarbamates, endosulfan, flufenacet, imidachloprid, linuron, metolachlore, metribuzine, pyrachlostroybine, terbutylazine,...
Pesticides are a type of diffuse pollution which might reverse the process of achieving the surface water’s and groundwater’s good status and good potential.

Pesticides are mainly measured in agricultural areas, particularly in run-off areas with a dense water system.

Map C2.1.3 ivc Pesticides in groundwater

Pesticides that are found in groundwater are usually used in agriculture. These substances slowly decompose into metabolites on the surface or in the soil’s upper layer.

Because of the slow percolation of water feeding the water table, the groundwater contains molecules or metabolites that are difficult to break down on the surface.

Almost 80% of the molecules that are detected in groundwater are herbicides, mainly atrazine and desethyl atrazine, but also simazine and other atrazine metabolites. Atrazine and simazine are no longer allowed for use since 1st October 2003.

Other pesticides are found just as well, such as diuron, oxadixyl (fungicide) or amotriazole. This diffuse pollution of groundwater can only be eliminated by natural drainage to drainage canals located on the surface.

Permanent weeding of railway tracks is necessary in order to safeguard the tracks. The ballast should indeed be clear of weeds, since otherwise the material would no longer be permeable and water drainage would be less optimal, which in turn would endanger the stability. The railway network’s tracks of all Parties are kept clear of weeds by a train equipped for geared spraying of pesticides, so that the use of pesticides can be reduced significantly.

In Belgium, such a train is equipped with nine cameras. These cameras allow automatic detection of weeds and spraying of the right mix and dose of weed killer.

In France, this is done by means of a Geographic Information System which is linked to agricultural GPS devices and adapted to the treatment of tracks. As one of them starts operating in a specific area, the GPS indicates in real time which spots must not be treated, such as waterways and river banks. At that moment, the stop valves are automatically shut, and they start working again upon leaving the area where the prohibition applies.

V Transport

In different ways, the transport of people and/or goods by road, railroad and waterways may exert pressure on the water system.

With regard to road transport, the fields along the roads are affected by pollution pressures as a result of drainage and soil sealing. The wear and tear of the road surface and car tires, the leakage of engine oil and the use of pesticides for the upkeep of hard shoulders may pollute surface water with heavy metals, PACs and pesticides. This pressure can be reduced by new techniques avoiding direct discharge into the natural environment. Putting in place this infrastructure may however increase the fragmentation of waterways.
Railroad transport may, as a result of wear and tear of overhead wires and brakes, lubricating oil on switches and the use of pesticides during the upkeep of railway embankments, give rise to pollution of surface water through heavy metals and pesticides.

Waterway transport may be a source of heavy metals and PAC in surface water because of leaching anti-fouling cuprous paints on ocean vessels, leaching PAC-containing coatings and oily water.

What is more, surface water extraction to ensure navigation on canals exerts pressure on the environment.

In France, pressure is likely to increase due to water transport as the Seine-North canal is being built.

Transport accounts for a major share in copper and zinc pressure on surface water. Copper pressure in Flanders, for example, amounts to 46%, whereas in the Dutch part of the Scheldt, this is 70%. In Flanders, the zinc load in surface water resulting from transport amounts to 11%, and for the Dutch part of the Scheldt, this is 50%.

For PACs too, transport constitutes an important load. Its share, in Flanders for example, varies between 32% and 86%, in the Dutch part of the Scheldt, it is situated slightly below 10%.

Vi Sediments

Pressure related to pollutants that are present in sediments:

Sediments, particularly in watercourses, tend to store organic and metal pollutants that are and were discharged during present and past human activities. Polluting sediments constitute a potential threat to aquatic organisms. Depending on the physical-chemical environmental conditions, one or a number of substances that are harmful to water ecosystems may leach into the water. Furthermore, this pollution entails some obligations regarding sediment treatment during dredging operations; this is considered to be waste as soon as it is treated on the continent in accordance with European regulations. Leaving a polluted soil untouched does not necessarily have a negative effect on the aquatic system. The potential bioavailability (harmfulness) of pollutants in the aquatic system is equally determined by a whole range of factors. A conscious approach will consequently be on a specific case-by-case basis.

Most areas in the district show major disruptions in the quality of sediments.

In France, metals pollute the Deûle, the Scarpe, the Scheldt and the Lys. These contaminations are most often due to historical pollutions by the mining and metallurgic industries, yet in certain cases due to some persisting discharges, such as in the Deûle.

In the Brussels region, measurements carried out in 2013 show that the metal concentrations were decreasing and that the PAC concentrations were rather stable. Generally speaking, sediments in the Senne are the most polluted ones. In the Canal, pollution is comparable to Senne pollution, yet it is not as large because of regular dredging to enable navigation. Thus, polluted sediment is regularly removed.

In the Flemish region, over 90% of sediments are polluted. Copper, mercury, zinc and lead are the most prominent problematic heavy metals. Pollution induced by PACs and non-polar hydrocarbons is spread all over. PCBs and DDT derivatives also often exceed the standards.

In the Dutch part of the Scheldt river basin, zinc is likely to come from sediments in the Canal Ghent-Terneuzen; for the Western Scheldt, we are talking about tributyltin and in the ‘Veerse Meer’,
polluted sediment is likely to be one of the elements at the origin of copper pollution. Sediment resuspension is likely to be one of the causes of PCBs exceeding the standard.

**Pressure due to dredged sludge**

Dredging is necessary in order to safeguard port access and to keep channels clear. Deeper draught of vessels and ships on the one hand, and the ambition to raise navigation’s share in intermodal transport on the other hand require widening and deepening operations. Other than the direct impact on benthic ecosystems, these interventions may enhance the concentration of suspended matter in water, as well as the leaching of pollutants stored in sediments. To avoid any significant environmental impact due to dumping and treatment ashore, dredged sludge needs to be handled with utmost care. The efficiency of the implemented measures requires follow-up.

In the district’s French part, pressure exerted by sediments as a result of dredging activities is significant, most of all in the river basin’s northern part (Nord Pas-de-Calais region). For the period 2001-2011, the yearly volume of dredged marine and continental sediments amounted to an average of 4.5 million m³. These are mostly marine sediments (10 times the volume of continental sediments). This volume should rise to 8 million m³ in 2016. This pressure’s evolution is mainly related to projects meant to restore waterways (reconstructive work, reopening to navigation, fitting-out works,…). Most of the time, continental sediments are managed as ashore (84%), unlike marine sediments (3%). For the period from 2007 to 2011, the average yearly volume of (marine and fluvial) sediments managed ashore amounted to 700,000 m³. For the period 2013 to 2016, this volume should go up to 1 or 2 million m³.

In the Brussels region, 40,000 m³ of sediments are dredged every year in the Canal/the Port of Brussels. This corresponds to the annual sediment supply. There is however a historical backlog which is estimated at 380,000 m³ and which persists due to a lack of financial means (substantial cost with regard to sediment pollution).

To ensure accessibility of the North Sea channels towards the Flemish sea ports and of the sea ports themselves, some 10 million tons of dry matter are dredged on a yearly basis. This concerns marine sediments that are re-introduced into the system at a number of indicated places at sea. A long-range monitoring program on the effects in terms of chemistry, biology and morphology is presently running.

In the Scheldt estuary, a sludge volume of about 15 million m³ is yearly dredged. This is dumped again into the water system, thereby following the ‘flexible dumping strategy’.

In the port of Antwerp, 600,000 to 800,000 tons of dry matter are dredged each year and taken to the Amoras dewatering plant for storage.

On the Upper Scheldt and other parts of the Scheldt river basin, sediments are treated ashore. Depending on the quality thereof, it is taken ashore for storage or to be used as spoil or building material. For the period 2007-2011, the average yearly volume of dredged sludge amounted to about 0.5 million m³.

Vii Hydromorphological pressure on aquatic ecology

A watercourse’s activity is closely related to its natural space and morphology.

More knowledge about the adverse effects on hydromorphology has been acquired since 2004. France, for example, has mapped the risks of adverse effects on homogeneous watercourse sections. In the Flemish Region, hydromorphology of its water bodies has been evaluated by means of several indicators. All data collected in the field contribute to determining the profile: the river
bed, the banks, the current, lateral continuity, longitudinal continuity (cfr. Obstacles to fish migration) and alluvial processes.

These adverse effects on hydromorphology tend to be divergent. According to the WFD, distinction is to be made between ecological continuity, discharge regime and morphological conditions.

In the Scheldt district, the pressure on ecological continuity is quite high, and this is illustrated by:
- Fish migration being hampered by a whole lot of obstacles per km of watercourse (number of obstacles in the district – (see Attachment 6.6 Master Plan Fish);
- Connections among watercourses with adjacent water systems (humid areas, spawning grounds,...). These adverse effects are generally due to hydromorphological conditions (for example, deepening of the river bed after straightening operations, several fitting-out works...). These are difficult to quantify.

This deterioration of continuity is closely related to numerous long-existing facilities (windmills, weirs, pumps for the polders...). The Master Plan Fish maps the obstacles for water run-off. As existing knowledge in 2004 was insufficient, this continuity parameter’s evolution can hardly be evaluated. Yet, it is to be noted that certain obstacles have already been removed in the district (see the Master Plan Fish).

Pressure on the district’s discharge regime is more difficult to analyze since water management is quite complex due to countless interconnected navigation canals, land reclamation, flood management and water transfers from the Meuse district to the Scheldt district and between coastal waters and the district via branch streams for the water supply from the Meuse district. Generally speaking and in view of the district’s intense navigation and urbanization, this pressure is quite high in the Scheldt district.

The deterioration of morphological conditions is still high. The watercourses’ natural mobility is thus affected in various ways due to shore construction as a result of strong urbanization in the district. In the past, their width and depth were modified for the sake of navigation and agriculture. Riparian forest, which plays a prominent role in aquatic ecosystems, is scarce. In addition, large quantities of fine particles are to be found in numerous watercourses, a phenomenon that is related to soil erosion (tamping as a result of cattle breeding, a lack of hays, scarcity of riparian forest...). Yet, in many places throughout the district, the restauration of the watercourses has been started.

Near harbors, refurbishing and maintenance works may influence the nearby natural environment. Sand extraction, land reclamation and the widening of channels of the past had an impact on the natural system. The recent deepening of the Scheldt, however, showed that applying a smart dredging and dumping strategy may lead to win-win situations. For example, dumping on sandbank edges in the Western Scheldt is expected to create new and valuable nature reserves.

Viii Other pressures

Among the other pressures, diffuse pollutions caused by pesticides used in sectors other than agriculture are one of the factors that constitute an obstacle for the good water status to be achieved according to the WFD, and one of the parameters requiring some action in order to reduce the degree of raw water processing for drinking water production. Beside farmers, local authorities and administrators of certain areas (communications, gardens, industrial areas, golf courts, parks...) also use pesticides. The pesticide loads ending up in water systems as well as their origin are hard to estimate. In France, for example, the national data on the sales of plant protection products allow to make an estimate of the substances used and to examine the evolution of this usage.
Perchlorate, too, is a diffuse substance causing problems at certain places in the Scheldt district. It has mainly an impact on groundwater, although surface water may just as well be polluted. In view of the war years that the river basin went through, this perchlorate originates mainly from large quantities of ammunition that were used up during the first world war. This is why this problem is particularly found at the frontline located between the Flemish plains and the Artois plateau. In addition, there are locally polluted areas (namely between Lens and Douai) where shells and warfare agents were recycled and/or sprung. As transport to these recycling centers was done on railroad tracks, which were sometimes at a certain distance from the frontline, France is presently making an inventory of its entire territory in order to map the scope of the problem. The other Parties have not carried out a perchlorate inventory.

**IX Summary of the main pressures**

The various Parties have used various methods to quantify pressures. These methods are based on discharge measuring data or on models taking as a starting point either estimates based on surface water quality data referring to watercourses, or pressure data. These methods may vary depending on the year concerned. This is why it is difficult to compare the various calculated quantities. The main pressures vary according to the region. However, the following aspects can be pointed out on a district level:

- Nitrogen pressure on surface water and groundwater mainly originates from agriculture (Fr: 79%, NL: 61%, VL: 59%, W: 44%), except for Brussels where the households’ share predominates. Supply also comes from the population or from industry. The Netherlands are the only ones to estimate the supply contributing to atmospheric pollution which provides evidence of the fact that this pollution’s share is not negligible (up to 27% in Zeeland).
- The contribution of phosphorous substances comes essentially from the population, except for Zeeland, where agriculture predominates.
- Erosion of farming land and urban or other runoff water cause a strong supply of suspended matter, pollutants, heavy metals, pesticides, nitrogen, phosphorus, ...
- In the entire district, pressure from urbanization and transport on the watercourses’ hydromorphology.

**X Specific pressures on groundwater**

The major part of groundwater that is extracted in the Scheldt district is intended for the production of drinking water. Achieving a good qualitative and quantitative status is consequently a priority for the Parties.

The coordination carried out on a Scheldt district level shows that the abstraction volume of groundwater in the Scheldt district amounts presently to 861.1 million m³/year, of which 601.6 million m³/year is intended for drinking water supply. These volumes remain almost identical to abstraction volumes in 2004 (844.5 million m³/year – 581.5 million m³/year).

Table 2.1.3_x gives a scheme of authorized or abstraction water flows for each Member State/Region.

Table 2.1.3_x. The authorized or abstraction water volumes of groundwater in 2012, including those intended for drinking water supply.
<table>
<thead>
<tr>
<th>State / Region</th>
<th>Expressed in terms of</th>
<th>Total (millions of m³/year)</th>
<th>Share of drinking water supply (millions of m³/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>Abstraction volumes</td>
<td>375.1</td>
<td>286.8</td>
</tr>
<tr>
<td>Walloon Region</td>
<td>Authorized water flows</td>
<td>166.5</td>
<td>120.2</td>
</tr>
<tr>
<td>Flemish Region</td>
<td>Authorized water flows</td>
<td>297.5</td>
<td>175</td>
</tr>
<tr>
<td>Brussels Capital Region</td>
<td>Authorized water flows</td>
<td>2.3</td>
<td>1.8</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>Net abstraction water flows</td>
<td>19.7</td>
<td>17.8</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td><strong>861.1</strong></td>
<td><strong>601.6</strong></td>
</tr>
</tbody>
</table>

It is interesting to note that France is indeed the main consumer, whereas in Wallonia the average abstraction intensity is the highest (i.e. in proportion to the water body’s surface), part of which goes to the Flemish and the Brussels Capital Region.

These volumes are chiefly abstracted from the chalk beds, the sedimentary aquifers, from karstic or fissured aquifers in the calcareous carboniferous strata in the Cambrian-Silurian socle (see table on transboundary aquifers).

Beside the quantitative pressure related to abstraction, qualitative pressure remains high, whether we are talking about local sources (urban and polluted industrial land) or diffuse sources (various farming activities) of anthropogenic origin, or about natural pollution (salt water intrusion, karst phenomena and geochemical background). An essential part of that pressure on aquifers dates from the past, as a result of bygone farming and industrial practices, since transported pollution from surface water to groundwater sometimes takes more than 30 years.

Climate change, involving the rising sea level, entails a number of consequences with respect to groundwater. A rising sea level will mainly have an impact on coastal areas and estuaries, which requires measures against floods, erosion and saline intrusion to be taken. Climate change will also increase water demand, which will have an impact on groundwater stocks.

Furthermore, variations in the rainfall pattern, increasing soil impermeability due to growing urbanization, and more compact soils are sources of additional pressure. And finally, there are numerous, often transboundary transfers between the district’s surface water and groundwater. All of these factors make it particularly hard to forecast the groundwater bodies’ future.

### 2.1.4 Economic analysis

#### I Households
The rising average yearly income per inhabitant keeps more or less pace with inflation. The gap between the region’s lowest and highest average income has gone down from 38% in 2001 to 32% in 2011.

#### II Industry and agriculture

##### ii-1 Gross Domestic Product
The GDP in the Scheldt District went up to a lower degree than inflation did, yet in comparison with the 15 ‘ancient’ member states’ GDP, it maintains its position somewhat better.
The main economic sectors
The sector ‘trade and services’ remains the Scheldt district’s main sector.

Cost recovery for water-related services
The cost recovery rates for water-related services taken into account by all Parties are outlined in a comparative table (Table 2.1.4._iii).

Table 2.1.4._iii Recovery rates for water-related services taken into account by all Parties

<table>
<thead>
<tr>
<th>Water-related services</th>
<th>FR</th>
<th>WL</th>
<th>BR</th>
<th>VL</th>
<th>NL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking-water supply and distribution</td>
<td>110%</td>
<td>101%</td>
<td>130%*</td>
<td>101%</td>
<td>100%</td>
</tr>
<tr>
<td>Public wastewater collection and purification</td>
<td>95%</td>
<td>90%</td>
<td>130%*</td>
<td>73%</td>
<td>100%</td>
</tr>
</tbody>
</table>

* Including only maintenance/operational costs, not the investment costs.

2.2 Climate change
Over the last few decades, the temperature, the periods of heavy rainfall and the heat waves in the Scheldt district have risen. The sea level is rising, as is the case elsewhere on the planet.

At the same time, the population is growing and its composition is changing (smaller families, ageing population, ...) as well as the population’s pattern of life.
To deal with these challenges, policies are being developed and actions are taken, but these need to be reinforced and international coordination is necessary.

A first strategic memorandum on ‘adaptation to climate change’ has been worked out for the Scheldt district. This memorandum presents a general description of the situation and expectations for the future. There is also a focus on the direct and indirect effects of climate change, the great challenges, the measures and recommendations regarding the Scheldt district. (see the 1st memorandum on the adaptation to climate change in attachment 6.4).

2.3 The district’s important water management issues
Defining the Scheldt district’s new important management issues was based on every Party’s great challenges. Along with the current state of affairs, they constitute the fundamentals of the Scheldt district’s management plan, as meant by the WFD.

Carrying out an internationally fine-tuned water policy scaled to the Scheldt river basin district
Two key objectives have been set, i.e. fine-tune water management scaled to the level of the international water basins and preserve and improve the water systems’ biological and chemical quality, including the seas and coastal areas.

The European Union (EU) has established a Community framework for water protection and management. The Water Framework Directive (WFD) stipulates in particular that the Directive’s implementation in international river basin districts be fine-tuned. The 6 contracting parties to the international Scheldt treaty, France, Federal Belgium, the Walloon Region, the Flemish Region, the Brussels Capital Region and the Netherlands, have decided that the WFD implementation should be coordinated at the International Scheldt Commission (ISC). It is in this context that the ISC presents the Scheldt district’s water management issues of common interest. They will be used as the fundamentals of the Scheldt district’s second management plan.

2.3.1 Surface water quality, hydromorphological changes
i. Unsatisfactory surface water quality
Since the WFD was approved in 2000, the water stakeholders have been improving constantly the fine-tuning process in order to achieve a better quality of the water bodies. Not only did this improve their state, but also the exchange of information as well as the common understanding of the systems and the pressures that they are exposed to. In spite of all Parties’ strong efforts to reduce pollution, the Scheldt district’s water quality is still unsatisfactory due to strong human pressure, which is partly to be attributed to households’, agriculture’s and industry’s pollutions from the past. The main causes of the bad water quality are an excess of nutrients, the dissolved oxygen rate and the concentration of some environmentally hazardous substances (metal and other micro-pollutants, PAHs, PCBs, pesticides and new substances of very high concern).

Monitoring these substances needs to be continued and to go along with the increasing knowledge, particularly thanks to the Homogeneous Monitoring Network (HMN) of the Scheldt. This monitoring will allow, through annual and triennial reports, a better quantification of the transboundary influences and the sources involved, in order to better fine-tune priorities and outline the set of measures.

By doing so, the regional, national and international cooperation is to further improve and even enhance coordination. The common objectives, the coordinated actions to fight pollution and the revision of updated programs of measures, most of all on both sides of borders, will be adapted and coordinated to come to a better control of emissions and to achieve the water bodies’ good status within the imposed deadlines. Climate change may even reinforce the pressure on water quality.

A large part of the Scheldt district’s surface water bodies and aquifers are struck in varying degrees by diffuse pollution originating from agriculture, from urban areas and from historical or by non-historical pollutions. The use of mineral fertilizers or organic dung, for example, might be a source of water pollution through soil erosion, by run-off, the wind, leaching out by the rain, etc. Similarly, the harmful effect on river banks and the unlimited access of cattle to watercourses contribute to the decline of the water quality. Within the Scheldt district, extreme weather conditions such as heavy thunderstorms in crowded cities and extending urban areas are just as important a factor when it comes to water pollution.

A couple of years ago, the riparian states and regions started up nitrogen and pesticides reduction management plans, yet the pollution of certain water bodies, particularly of groundwater bodies, keeps rising. Managing this diffuse pollution within the Scheldt district will be one of the major challenges. Parties will continue to exchange information on relevant practice and knowledge. Coherent measures implemented on both sides of the borders may reinforce the coordinated protection of water resources and systems.

ii. **Scheldt-specific pollutants**

The HMN has identified a number of micro-pollutants and parameters that might prevent achieving the good status: copper, cadmium, mercury, lead, zinc, polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organotin compounds, pesticides and their degradation products.

These micro-pollutants have negative effects on human health and the environment, even in very low concentrations. In addition to the micro-pollutants, new substances of very high concern are regularly found during monitoring campaigns and thanks to improved analyzing techniques. The objective of reducing these substances needs to focus particularly on keeping up and improving the water systems’ biodiversity, on ensuring high-quality drinking water to all of the district’s inhabitants and allowing all water uses in the district, so as to finally achieve the good water status.
Beside the pollutions that are characteristic for the entire Scheldt district, some pollutions or parameters may have locally a significant transboundary impact. Deliberation on these pollutions or parameters can be bilateral, trilateral or multilateral.

On a regular basis, the list of monitored substances and the structure of the homogeneous measuring network will be revised. Triennial reports will bring the evolution of these substances, their origin and the impact of the measures to attention. Parties can be recommended to improve, for example, the coherent character of the programs of measures on both sides of the borders.

Furthermore, incidental transboundary pollutions are also dealt with fast and adequately thanks to a well-working alarm system.

iii. **Important hydromorphological changes**

The Scheldt is a lowland river with a low flow rate. Initially, it meandered through large floodable plains. In its quite dynamic estuary with numerous sandbanks, there used to be an intensive exchange between land and water. Throughout the years, strong population growth, industrial development and agriculture have led to quite some hydromorphological changes in the Scheldt district’s water system. In the past, dikes were built, watercourses were straightened and canalized, on the one hand to enhance navigation, and on the other hand to accelerate water drainage and avoid floods.

These modifications have changed the natural characteristics of some watercourses considerably. They put the water system’s ecological processes under pressure, entail a loss of biological diversity and reduce the opportunities for fish to reproduce and migrate.

Present-day knowledge shows that by straightening watercourses in the past, by hardening the soil nowadays and because of the future effects of climate change, flood risks are likely to increase.

The WFD admits that changes may be necessary for activities to ensure sustainable human development and it enables adjusting the objective for strongly modified or artificial water bodies: the Good Ecological Potential (GEP).

Over half of the Scheldt district’s water bodies are identified as strongly modified and they are given special attention during the implementation of the WFD. This is why the measures aiming at restoring the hydromorphology continue to be carried out. They are geared to preserve and restore the river system in terms of quality and quantity, to push back erosion and sediment transport, and so just as well to reduce the supply of nutrients. Taking for granted the water systems’ natural processes, these measures tend to prevent and/or reduce the negative effects of floods; e.g. by restoring the wetlands located next to the watercourses.

The preservation and improvement of biodiversity in the water system and the wetlands provides a better connection of water ecosystems in the district. This is one of the Scheldt district’s ecological challenges, just like the blue-green structure or the blue-green network. Similarly, restoring free fish migration by carrying out a Master plan fish on the scale of the Scheldt district is another of its working points. These measures also allow fighting the negative effects of drought, a phenomenon likely to occur more frequently in the light of climate change.

Awareness of the ecological minimum flow rate and the links between surface and groundwater would be useful for the preservation of the watercourses’ biological quality.

To conclude, enhancing the environment-friendly character of river banks in terms of walking trails, cycle tracks or nature reserves makes citizens feel more involved in the world of water.
Managing protected areas is a common challenge in the district, and the set of measures meant to fight pollution and to improve the hydromorphological quality should enable Parties to reach the objectives set for these areas.

2.3.2 Vulnerable groundwater
i. Chemical state of groundwater
Due to the magnitude of past and present pressure, most groundwater bodies in the Scheldt district are in bad condition, particularly the water bodies located closest to the surface. That is where the significant interaction with surface water and associated terrestrial ecosystems often plays a role too.

In the Scheldt district, groundwater bodies are mostly classified as being in bad condition, given the presence of nitrates and of, although to a lesser degree, pesticides and their degradation products (metabolites). Member states/regions need to propose threshold values for the remaining pollutants in every water body.

More profound studies are required in order to define the groundwater’s good chemical state having an impact on surface waters and the corresponding terrestrial ecosystems. Dealing with pollutants at their source allows to eventually reach the quality objectives.

Additional prevention and restoration measures need thus to be taken in order to reach groundwater’s good status.

The protection of water supply and extraction areas to ensure availability of water intended for drinking water production is a prominent objective that needs to be met.

ii Quantitative state of groundwater
Some deeper groundwater bodies, such as the calcareous carboniferous strata, are at risk in view of overexploitation.

These water bodies’ water management issues depend of course on the usage at the end of the line, which may vary from one party to another, from one sector to another (drinking water, water for irrigation and for industrial purposes, safeguards for maintaining a sufficient flow level in watercourses).

A strengthened approach is needed to protect groundwater, not only to prevent pollution but also to protect groundwater resources in the long run, as stipulated by the Directive, with a special focus on the water bodies used for the production of drinking water.

The transboundary aquifers require specific fine-tuning among Parties in order to safeguard the good chemical and quantitative state.

2.3.3 Revalue the water experience
Water users and the broad public should be better informed about how water systems work and they need to be made aware of their value.

Although the decreasing water usage is taking hold in the Scheldt district, pressure on surface and groundwater resources remains high.

Raising citizens’ awareness of how water systems work remains essential to change habits and to use the available water supply sustainably, f.i. using water sparingly, meant to respect watercourses,
and reducing pesticide use. Respecting the watercourse implies the following: the prohibition to discharge green waste in watercourses and on river banks, to pour toxic products (such as medicines, paint, solvents, mineral oils) into the sewer system, etc. As for responsible water use, it is essential for the recycling of rain water to be promoted. Important aspects are the further development and better coordination of communication strategies on a district level. Raising the citizen’s awareness also means trying to change everyone’s habits in order to better protect the water resource in order to ensure sustainable use.

The exchange of ideas on local initiatives, such as river contracts, is important and it requires further development likewise.

Most cities in the Scheldt district have grown thanks to water, yet as wetlands disappeared and watercourses were vaulted and embedded in stone, the link with water and water-related activities diminished.

This is why it is essential for water to be re-integrated into the citizen’s living environment. One way to do this could be to make water more visible in the landscape and urban areas by integrating the concept of water into town and country planning, such as the upgrade of river banks.

The appreciation of surface water and its ecological riches, most of all in the valleys, needs to be given a higher focus as it is one of the landscape’s structuring elements.

In order to reduce heat wave effects in big cities, it could be useful to develop blue areas generating a more moderate urban microclimate.

2.3.4 Coastal water

As a result of strong human pressure on the Scheldt district’s coastal area, the physical-chemical and biological quality of coastal and transitional water is insufficient. Due to the numerous influences, a strong regional, national and international cooperation is necessary, as well as a coherent implementation of the water framework directive (WFD) and of the marine strategy framework directive (MSFD).

Preserving and/or restoring coastal and marine waters and the corresponding protected areas is one of the major challenges in the district. The increasing coastal tourism, the rising use of coastal water (recreation, transport and energy), as well as the rising sea level due to climate change will have a strong impact on the coastal area. This impact will be visible in terms of pollution, swimming water quality, erosion, flood risks and saltwater intrusion into aquifers located at the coast, and into coastal ecosystems. Similarly, the impact of floating debris, the migratory pattern of fish stocks and eutrophication enhancing phenomena such as algal bloom, show a rising trend. It is important to tune the efforts regarding adaptation to climate change to those related to the framework directives (WFD – MSFD) for the purpose of reaching the good state for coastal and transitional waters.

2.3.5 Economic analysis

Water is a public social good that should be available to any citizen. However, the costs related to water supply and purification are considerable and it is up to the member states to see to it that these costs remain affordable to citizens.

The implementation of the 2nd management plan will require Parties to make a strong economic effort, comparable to the 1st management plan. The cost-effectiveness analysis and the cost-benefit analysis revealed clear differences among parties, with respect to both national or regional economic indicators, and the implemented
measures (cost-benefit assessment methods, the impact calculation,...), which led to fruitful exchange of experiences within the ISC.

Since welfare and the structure of economic activities diverge enormously from one region to another, it is recommended to follow up and refine the economic indicators identified at the time the survey was made, and care should be taken to make them fit in with the pressure indicators, particularly for the coordination and coherence of programs of measures, based on a cost-effectiveness approach on both sides of the border.

Sustainable funding of water management is a big challenge according to the polluter-pays and water-pays-for-water principles (cost recovery).

Furthermore, it is important to highlight sufficiently the benefits of high-quality water and the efforts to achieve that target.

2.3.6 Fighting floods
The Parties regularly have to face floods. The measures aimed at preventing the effects in the context of the implementation of the flood risk directive – assessment and approach (FRD) - need to be harmonized with the WFD-related measures.

2.3.7 Managing drought effects
Water quantity management is needed to meet our needs in terms of water as well as the ecosystems’ needs (and to contribute considerably to their restoration), and to make sure the effects of flooding are not enhanced any further. This water quantity management does not only have an economic dimension, but an ecological one as well.

By means of consultation, the Parties want to strive, all year round, for a balanced water quantity management shared between the parties involved and the ones benefiting from it.

2.3.8 Effects of climate change on “fresh water ecosystems” and various types of water use
Take the impact of climate change into consideration: in the Scheldt district, we need to adapt to climate change. The Scheldt district will have to deal with climate changes (temperature, rainfall,...), which are liable to influence the water cycle: ecosystems, water use, (marine) flood protection, erosion and salt water intrusion are prone to profound changes. The yearly precipitation regime’s trend will be different. Extreme climate phenomena will occur more frequently and more intensely. The rising temperature of surface waters will reinforce eutrophication even more and enhance changes in ecosystems and possible fish mortality. Reaching the good state might, for some water bodies, be rendered more difficult.

Parties need to exchange information on climate scenarios and adaptation plans, and a coherent and coordinated adaptation strategy in the light of climate change must be worked out, in line with the WFD, FRD and MSFD implementation.

Additional adaptation measures need to be taken to ensure that we adapt to these changes, to safeguard water supply and to achieve the good state, both for surface water and for groundwater.

2.3.9 Governance

I Good governance
Every state and region must make sure that the WFD is implemented on their territories. In addition, the various Parties within the Scheldt district must nevertheless also ensure mutual coordination.
For the Scheldt district, this voluntary coordination was formalized in 1995 by means of the Charleville-Mézières treaty, and ratified by the Treaty of Ghent on 2nd December 2012, which appointed the ISC as the international coordination platform for the implementation of the WFD and the FRD.

The aim is to cooperate and to contribute to sustainable development by taking the adequate measures for integrated Scheldt district management. Consultation and exchange of information are very important for the district’s border water bodies and coastal waters.

The challenges are huge, yet the means are limited. Budget-related decisions must be the result of better sustainable, cross-border and coherent water management for the district, without undoing the expected improvements in the water bodies’ water quality.

II Reinforce interregional and international cooperation
In this context, the transboundary cooperation needs to be reinforced, the exchange of data, methods, measures and experiences needs to be facilitated and standardized. All of these actions must contribute to the realization and the implementation of sustainable international water management in the Scheldt district.

2.3.10 Data, measuring methods and assessment methods
Enhancing the coherence of each other’s measuring methods, assessment methods and environmental objectives is a fundamental challenge to come to a more coherent district management.

The management plan roof report deals with all of these challenges, aimed at the good ecological, chemical and quantitative state in the Scheldt district’s water bodies.

2.4 Alignment in characterizing the water bodies
2.4.1 Cross-border water bodies
I Generalities
Groundwater bodies are formed by one or more aquifers, to the extent that they are possibly interconnected in hydraulic terms.

After initially characterizing the Scheldt district’s groundwater bodies, it was the water bodies at risk that were defined according to Annex II of the procedure described in the WFD.

Every Party has continued characterizing at their water bodies’ scale by gathering additional information allowing them to assess more adequately the influence of human activities on their water bodies. The newly acquired relevant information regarding transboundary aquifers is exchanged and aligned among the various Parties.

The methods meant to demarcate groundwater bodies have not changed since the 2005 report. The conclusions drawn at that time are still valid. The maps c2.4.1_ia, c2.4.1_ib and c2.4.1_ic present the various groundwater bodies in the Scheldt river basin district.

Map C2.4.1_ia: Groundwater bodies in the Scheldt district level I
Map C2.4.1_ia: Groundwater bodies in the Scheldt district level II
Map C2.4.1_ia: Groundwater bodies in the Scheldt district level III

A number of groundwater bodies are part of transboundary aquifers and they are presented in table T2.4.1_PA5_ETAT aquifers_trans_2012, which reflects the current state of the transboundary aquifers.
Most of the information about these groundwater bodies (see annex 4.2) was gathered in flash cards for bilateral/trilateral coordination of the transboundary aquifers (coordination flash cards). All along the international district coordination, these flash cards will be subject to an iterative evolution in terms of adjustments. These flash cards are a tool for coordination and alignment within the Scheldt district.

**II Vulnerability and drought-sensitive groundwater bodies**

The vulnerability of an aquifer is a subjective notion and it is determined by its natural degree of protection against anthropogenic pollutions or by the natural mineralization of the aquifer due to the variable water levels, which leads to a deteriorating chemical quality. As for the quality, the Analysis Roof Report’s conclusions remain unchanged. Over 1/3 of the water bodies are considered to be very vulnerable, irrespective of whether we are talking about diffuse pollution or point pollution.

Drought-sensitivity is related to phreatic aquifers being not or insufficiently supplied. For instance: dune sands (Flemish Region) are more drought-sensitive than the Cretaceous Area (France), as they depend directly on the weather and climate conditions of that particular year. The risk of an imbalance in groundwater bodies rises as more water is extracted. The imbalanced supply versus extraction shows in lower groundwater levels as illustrated by the saturation line’s evolution in the transboundary aquifer of the Carboniferous limestone, or in the rising fresh/salt-water interface.

Climate changes and reduced infiltration might reinforce that imbalance.

Making up coordination flash cards has allowed parties to exchange information on the notions of vulnerability and drought-sensitivity.

The aquifer of the Carboniferous limestone has been given particular attention by means of cross-border modelling in order to obtain better insight in the aquifer’s hydraulic functioning. Reports on this study are available at the ISC. See also the text box on page 54.

The study has also allowed to better assess the global impact of new extractions or geographic modifications on a water body scale.

**III Identification of the groundwater bodies with depending ecosystems**

When identifying groundwater-depending ecosystems, the existing protected areas (Natura 2000) are taken into account, and/or hydrological knowledge is used (exchange between groundwater and surface water).

As a result, it was concluded that a total of 34 groundwater bodies are linked to such ecosystems (6 in France, 6 in the Walloon Region, 17 in the Flemish Region, 1 in the Brussels Capital Region, and 3 in the Netherlands).

**2.4.2 Commonly shared surface water types**

**I Typology in demarcating surface water bodies**

The types utilized by the parties to characterize their surface water bodies (rivers, lakes, coastal and transitional water) have remained almost identical in comparison to the 2005 Report. Consequently, the similarities and differences between national/regional types found in 2005 remain unchanged to a large extent.
**Fresh surface water:**
Based on the coordination filing cards, it has been found that most typology and state designations are similar, except when the watercourse’s structure changes form one region to another, as for example:

- The Aa Delta, hard to compare: this big French water body is heterogeneous – a part of the water body is not of the same type (the Basse Colme canal (FR-VL))
- The Woluwe in the BCR (small brook without any significant pollution pressures) and on Flemish territory (large brook with significant pollution pressures);
- The Western Scheldt on Flemish (tidal river) and Dutch (estuary) territory.

The main difference in the Parties’ approaches is related to the watercourses’ size as a water body: Wallonia listed all of its watercourses, even the smallest ones, France preferred to follow up only the main watercourses and the other Parties opted for an intermediate approach.

For the *coastal and transitional waters*, the national types have been translated into the European intercalibration types.

As a result, neighboring water bodies of the same type could be designated:

- *Coastal waters*: European intercalibration type CW-NEA 1/26b (Enclosed seas, exposed or sheltered, euhaline, shallow) coastal waters shared by France, Belgium and the Netherlands.
- *Transitional waters*: TW-NEA11, shared by Flanders (Maritime Scheldt) and the Netherlands (Western Scheldt).

For reporting purposes, national typologies, varying from one member state to another, continue in use.

In the entire Scheldt district, 361 fresh surface water bodies have been demarcated, 10 coastal water bodies and 11 transitional water bodies. This means 239 less than in 2005.

Map C2.4.2_ia: Comparable surface water types
Map C2.4.2_ib: Surface water, with indication of categories and types

**II Transboundary aspects**
The Scheldt district is made up of quite some transboundary watercourses. Consequently, a large number of ‘neighboring water bodies’ are to be found in Table T2.4.2_i ‘neighboring water bodies’.

For each of these watercourses, the characterization’s cross-border coherence (and of other aspects – see next chapters) is studied on a bilateral or multilateral basis. This helped constitute flash cards for the transboundary watercourses. These working documents can be consulted on the ISC website. They are in constant evolution, allowing parties to fine-tune various WFD aspects bilaterally. It should be borne in mind that the four surface water categories (rivers, lakes, coastal and transitional waters) were defined in the Roof Management Report 2009.

**2.4.3 Indicating the strongly modified water bodies**
The strongly modified water bodies’ characterization has been updated (revised procedure and/or requalification of water bodies).
Tables 2 and 3 present a districtwide overview of the number of surface water bodies having been indicated as strongly modified (SMWB), artificial (AWB) and natural ones, in accordance with the updated river basin management plans.

More heavily modified water bodies were indicated in 2005. This is mainly thanks to increased insight and newly developed working methods.

3. Monitoring and status assessment

To improve each other’s knowledge, to reduce uncertainty and enhance coherence among measures taken on both sides of the borders, the ISC has developed a tool for surface and groundwater bodies: the coordination flash cards.

These flash cards have been used as a background for this chapter.

3.1 Groundwater

3.1.1 Monitoring networks

During the international coordination within the Scheldt district, information was exchanged on the groundwater measuring networks for surveillance monitoring, with a particular focus on the transboundary aquifers.

Map C3.1.1 shows where the measuring points of the qualitative and quantitative monitoring networks, set up by the competent authorities, are located.

Map C3.1.1: monitoring networks for the quantitative and chemical state of groundwater bodies in regard of transboundary aquifers.

The density of the controlling points in respect of the quantitative state is as high as the one used for chemical monitoring.

3.1.2 International coordination regarding the chemical and quantitative assessment of the groundwater bodies’ state

In 2005-2006, every party started framework directive-specific measuring campaigns that allowed to establish a chemical and quantitative state assessment of the groundwater bodies, constituting the starting point for the trend assessment.

1 Chemical state

The groundwater bodies’ state assessment is based on the results of the measuring networks, the density, the nature (wells, piezometers, sources,...) and the extraction depth which may vary from one party to another. In the Scheldt district, 22 transboundary aquifers have been counted. In this respect, every party has determined criteria to assess the state, some of them being nitrate, pesticides and polluting parameters due to which the groundwater has been assessed to be at risk. The ‘at risk’ parameter(s) was/were, is/are specified in the flash cards. In this context, the impact of salt water intrusion on the quality of surface water or terrestrial ecosystems depending on groundwater, or on the quality of the extracted groundwater intended for human consumption, has also been studied.

In case of a ‘bad state’, parties take measures to restore the good chemical state. In spite of strictly scientific approaches, it is often difficult to predict the return of ‘the good qualitative state’. The hydrogeological features are indeed spatially so heterogeneous that run-off processes within the aquifers are hard to model and that the improvement that such measures are expected to enhance can hardly be quantified.
Map C3.1.2_ia and Map C3.1.2_ib present the assessment based on the monitoring program’s analysis results for nitrate and pesticides.

Map C3.1.2_ia1: Groundwater quality assessment at measuring points for nitrate

Map C3.1.2_ia2: Pesticides in groundwater

Within the Scheldt district, the methods used by the various competent authorities to assess their groundwater bodies’ chemical state have been compared on the basis of the monitoring network results. These methodologies are listed in Table 3.1.2.

There are several explanations for the divergence of chemical state assessments, viz.:
- Differences in the use of groundwater bodies;
- Differences in threshold values fixed by the Parties;
- The monitoring networks’ particularities.

Map C3.1.2_ib: chemical and quantitative state 2007 for groundwater bodies – Level I
Map C3.1.2_ic: chemical and quantitative state 2007 for groundwater bodies – Level II
Map C3.1.2_id: chemical and quantitative state 2007 for groundwater bodies – Level III

Map C3.1.2_ib: chemical and qualitative state 2007 for groundwater bodies – Level I
Map C3.1.2_ic: chemical and qualitative state 2007 for groundwater bodies – Level II
Map C3.1.2_id: chemical and qualitative state 2007 for groundwater bodies – Level III

Map C3.1.2_iib: chemical and quantitative state 2012 for groundwater bodies – Level I
Map C3.1.2_iiic: chemical and quantitative state 2012 for groundwater bodies – Level II
Map C3.1.2_iid: chemical and qualitative state 2012 for groundwater bodies – Level I
Map C3.1.2_iiic: chemical and qualitative state 2012 for groundwater bodies – Level II
Map C3.1.2_iid: chemical and qualitative state 2012 for groundwater bodies – Level III

Table T3.1.2_survey assessment of chemical and quantitative state of groundwater bodies from 2007 to 2021

ii Quantitative state
For the assessment of the quantitative state, the trend analyses of the piezometric measurement series is taken into account, along with a survey of the hydrogeological state.

The coordination among parties sharing a particular aquifer is a top priority when it comes to guaranteeing the resource’s sustainable management (see text box on the carboniferous limestone).

Map C3.1.2_ii: Groundwater bodies related to the Carboniferous/ Salt water intrusions.

Study of salt water intrusion in the polders located on Flemish and Dutch territory

The ScaldWIN project also included a study of salt water intrusion in the polders located on Flemish and Dutch territory. The study showed the link between historical evolutions in the coastal area and the presence of lenses in the fresh water aquifer. Proposals on how to manage salt water extractions have been worked out in order not to deteriorate the salinization of the exploited aquifer.

Carboniferous limestone
In the Carboniferous limestone aquifer, an important water supply can be found. It extends over three adjacent district water bodies, managed by France, the Flemish Region and the Walloon Region. An objective assessment of the quantitative state revealed the problematic state it is in. The abnormally reduced groundwater level was attributed to former overexploitation, and it required transboundary management. For that reason, the three parties involved started consultations, the results of which led to a joint declaration presented during the Tournai colloquium in February 2007. In July 2009, LMCU (MÉTROPOLE ÉVROPEÉENNE de Lille, France), VMM (Vlaamse Milieumaatschappij, Flemish Region) and DGARNE (Direction Générale de l’Agriculture, des Ressources naturelles et de l’Environnement, Walloon Region) signed a trilateral agreement for a joint characterization and modelling study, resulting in a supportive tool for sustainable management. This project was sustained by European funds obtained from the Interreg IV B NEW program in the context of the ScaldWIN project.

The study was performed by the Bureau de Recherches Géologiques et Minières (FR), together with the University of Mons (B). Its scientific and technical program consisted of two stages: a stage allowing the gathering of physical-chemical data, and a stage implying the hydrodynamic modelling of the transboundary aquifer. Early 2014, this study led to a model, as well as to two projections over a time horizon up to 2050. The study’s results indicate that, irrespective of the scenario used, the presently found rising levels in areas with a major decrease, should continue to rise during the forthcoming decades. The study constitutes a scientific step forward in terms of how the carboniferous limestone’s aquifer works and of how it needs to be managed. The model is available to all three parties managing this water source, and so they can use and modify it to do their own research.

Other forms of cooperation among the ISC Parties are being considered to deal with matters related to the impact of the shared water sources. See: http://www.brgm.fr/projet/modelisation-hydrodynamique-aquifere-transfrontalier-calcaire-carbonifere-region-lilloise

3.2 Fresh surface water
In accordance with the Water Framework Directive (WFD) 2000/60/EC, the members of the international Scheldt commission monitor the water quality of the international Scheldt district on the basis of the national monitoring networks.

3.2.1 The Homogeneous Monitoring Network for the Scheldt (HMNS)
Based on the monitoring networks, an international quality tool was set up in 1998: the Homogeneous Monitoring Network for the Scheldt (HMNS), which provides a cross-border and coordinated picture on the scale of the Scheldt river basin. It was adapted to the WFD requirements in 2011. The monitoring network’s objective is coordinated monitoring of the surface water quality and to provide a harmonized picture of the Scheldt district’s surface water quality, particularly in transboundary watercourses. Monitoring comprises the districtwide physical-chemical, chemical and biological parameters included in the list of parameters that need to be monitored in the WFD context.

It should allow dealing with the following questions:
- What are trends and evolutions like?
- What about the causes?
- Do the Parties’ programs of measures and the management plans entail measurable effects?

The HMNS follows 35 measuring points operated by the various parties. These measuring points have been chosen by the parties from a series of existing monitoring networks implemented especially for the WFD. They are representative of the surface waters in the Scheldt district, and allow to obtain a harmonized and cross-border picture.
The following parameters are followed up:

- The extreme low water conditions that are part of the quantitative follow-up.
- General biology sustaining physical-chemical quality elements: oxygen supply, salinity, acidification, nutrients. On top of these, there are also the hardness and dissolved organic carbon, which are useful when testing the quality standards for certain heavy metals.
- Scheldt district-relevant pollutants for the physical-chemical quality (copper, zinc and PCB’s);
- Chemical quality elements, substances defined by daughter directive 2008/105/EC as being priority substances and priority hazardous substances. These substances must meet the environmental quality standards (EQS).
- Biological quality elements: diatoms, macroinvertebrates and fish, wherever these analyses are relevant.

To make sure results are comparable, all methods of analysis have been compared with one another in terms of quality, exactness of results, reporting scope and sampling method, by organizing yearly meetings with the heads of laboratory and measurements. Data management has been centralized, and a joint exchange format has been defined.

In a triennial report on the water quality between 2011 and 2013, the quality evolution is studied more thoroughly and for some parameters, the root causes of that evolution are examined. This report is completed by a yearly report on the quality of the Scheldt water. (see triennial report in attachment 6.5).

3.2.2 International coordination regarding the chemical and ecological state assessment of the surface freshwater bodies

In accordance with the Water Framework Directive (WFD) 2000/60/EC, the parties in the international Scheldt district monitor the water quality on the basis of their national monitoring networks. The HMNS is there to complete the national reports in order to provide an international and coordinated picture on a Scheldt river basin district scale.

The coordination within the Scheldt district also encompasses the intercalibration of laboratories entrusted with analyses; these are the same as the ones in charge of monitoring the district’s member states. All of them, moreover, take part in the coordinated intercalibration campaigns.

Map C3.2.2a: Ecological state of surface water
Map C3.2.2b: Chemical state of surface water
Map C3.2.2c: Chemical state of surface water, without ubiquitous substances

I General parameters

i-1 Chemical quality elements

The chemical state is determined by substances that, according to the Framework Directive, are priority substances and priority dangerous substances, and some other pollutants as described by Directive 2008/105/EC, the so-called EQS directive. There are 41 chemical parameters (33 priority substances and 8 other pollutants). For these substances, the environmental objectives need to be complied with. All substances determining the chemical state will be analyzed and follow-up will be coordinated within the HMNS, except for chloralkanes.

The metal concentrates measured in filtered water (Hg, Cd, Ni, Pb) and considered to be priority substances, do not exceed the standards set for the HMNS.
One chapter of the triennial report on the HMNS focuses on PAHs, carcinogenic organic substances, composed of two or more benzene rings and often the reason why the good chemical state is not achieved in the district, and diuron, a pesticide taken as an example for which regulations and prohibition-related measures produce quantifiable effects in the entire Scheldt district.

The polycyclic aromatic hydrocarbons (PAHs) are a group of compounds consisting of several hundreds of similar substances. Only a few of them — among the most problematic ones — are regulated during the assessment of the water bodies’ chemical quality.

These substances are usually released in case of incomplete combustion of organic matter such as fuel, wood, tobacco. That way, they pollute surface water, mainly through the air, especially by means of atmospheric deposition.

This process contaminates all surface water bodies in the Scheldt district. Upon comparing the data that we have at our disposal, we notice that standards are exceeded almost everywhere for the sum of benzo(ghi)perylene and indeno(123-cd)pyrene and benzo(k)fluoranthene. The other standardized PAH’s have been found to exceed these standards on a rather local level.

In the near future, no significant evolution of the situation is expected, given the limited amount of available means to fight this problem.

i-2 Scheldt-relevant pollutants
This is about copper, zinc and PCBs, parameters selected to be relevant for the district by the International Scheldt Commission. These substances have locally a significant impact.

Since PCB analyses in water are not representative enough (PCBs are hardly soluble), there is no way to pronounce on whether the standard is exceeded or not.

For heavy metals copper (Cu) and zinc (Zn), there are national EQS’s.

Copper is found in almost all measurement points. However, the copper concentrations measured are below the national environmental quality standards as regards yearly averages and maximum authorized concentrations.

In the Scheldt district, it has come to light that the amount of zinc is higher than the national environmental quality standards (yearly averages). The national standards are sometimes exceeded in the Scheldt and the Deûle in France, as well as in the Scheldt at ‘Schaar van Ouden Doel’ in Flanders.

In the Scheldt district’s salt water section, the standards applying in the Netherlands are exceeded, even if you take into account the biological availability.

ii Biology
The biological quality, as referred to by the Water Framework Directive, is evaluated by means of the reference conditions, i.e. the environmental conditions in the absence of human pressure. Although reference conditions can be determined for natural systems such as rivers, this procedure is quite different when it comes to canalized or artificial watercourses, which make up a large part of the Scheldt district’s systems and the systems examined in the HMNS.

The biological quality elements that are followed up are these:
- Algae (phytoplankton and phytobenthos)
Most of the district’s watercourses continue, based on the ecological quality coefficient (EQC), to be evaluated as insufficient.

**iii Low water**

Map C3.2.2_iii presents the average monthly flow rate for the driest month in 2013, which was August.

The low water conditions on a Scheldt district scale are mapped on a yearly basis. A typical feature of the Scheldt district’s watercourses is their lowland river regime, so their extreme low water flow rates are quite low, which has an impact on the concentrations measured and on biology. In 2012 and 2013, there were no issues in terms of extreme low water events. In 2011, the distinct lengthy low water period led to drinking water supply problems in the Yser basin. Furthermore, the fresh water resources may be at risk at certain places.

### 3.3 Coastal and transition waters

#### 3.3.1 Measuring networks

A comparison of the monitoring programs for surveillance monitoring of biological quality elements reveals that all parties will meet the WFD’s minimum frequency requirements. Some parties apply a higher monitoring frequency for certain quality elements than the frequency imposed by the WFD, in order to generate a sufficient amount of data to allow a reliable evaluation.

Table T3.3.1_i: Monitoring program for coastal and transition waters

Map C3.3.1: Monitoring of coastal waters

Possible differences in the parties’ measuring frequencies of the surveillance monitoring (WFD, MSFD and OSPAR) in coastal waters are counterbalanced by operational monitoring.

**I Monitoring of biological quality elements in coastal waters**

*Phytoplankton:*

In the context of the Water Quality Monitoring project (MarCoast), OSPAR (the convention’s strategy regarding eutrophication), the WFD and MSFD, phytoplankton in coastal waters is assessed via satellite, by means of the chlorophyll a concentration, calculated by using color differences in the sea as a reference. In France, the data obtained through this method are available, yet they are not used for WFD indicator phytoplankton.

The amount of samples and the sampling frequencies vary from one area to another and they depend on the cloud cover and the quality, etc. For the Belgian coastal area, quantities ranging from 25 to 45 samples can be taken every growing season (March-October).

Data portals for RBINS’s MarCoast data are:

http://www.artois-picardie.eaufrance.fr/
http://www.odnature.be/remsem/remote-sensing
Quality element phytoplankton’s parameters have been harmonized in such a way that the measurements’ frequencies are also considered.

**Macrobenthos:**

In terms of monitoring strategies and assessment of macrobenthos in coastal and transition waters, exchange of information between the Flemish Region, Federal Belgium and the Netherlands is positive.

Macrobenthos is assessed by means of the BEQI Index. In the context of the Homogeneous monitoring network Scheldt (HMNS), there are 4 measuring points in transition waters (4 in the Western Scheldt, the Netherlands) and 3 in coastal waters (1 in Belgium, 2 in the Netherlands).

**II Surveillance of the chemical state**

All the parties control the concentrations of Scheldt-specific substances copper, zinc and PCBs, an operation that includes the verification of the results (with regard to copper, this is to be found in the entire district, yet it only exceeds standards in the Western Scheldt in the Netherlands – see the triennial report in attachment 6.5).

During the implementation of the marine strategy framework directive (MSFD), a monitoring program has been worked out by the member states or the marine sub-regions’ representatives.

Within the Scheldt district, both the WFD and the MSFD monitoring programs include the coastal waters. As for the Scheldt district’s coastal area, and with respect to the joint WFD subjects (eutrophication, chemical pollution), the MSFD monitoring programs reinforce the WFD monitoring by integrating existing national stipulations or stipulations already carried out in the OSPAR context.

**3.3.2 International coordination regarding the chemical and quantitative state assessment of the coastal and surface waters and water bodies.**

**I Assessment of the chemical state and of substances, specific for coastal and transition waters**

Table T3.3.2_ia Summary of the assessment results regarding the 42 priority substances and Scheldt-specific substances for adjacent coastal and transition waters of one and the same type.

The chemical state assessment of the district’s transboundary coastal and transition waters shows that almost all substances monitored within the framework of the Homogeneous Measuring network of the Scheldt (HMNS) contribute to a good state. We are referring to the WFD’s hazardous substances that are relevant to the Scheldt, with the exception of the PAHs (ubiquitous substances), dissolved cadmium in the Netherlands and tributyltin (biocide used as a pesticide and for antifouling) in the Scheldt estuary (Western Scheldt).

Table 3.3.2-ia provides each delegation with a survey of the assessment of the 41 priority and 3 ISC-specific substances for the transboundary coastal and transition waters.

Globally speaking, it can be concluded that most parameters’ standards are not exceeded.

The Western Scheldt does not meet the standard set for dissolved cadmium. Furthermore, PAH standards are exceeded in most water bodies.

38
Ecological state of coastal and transition waters up to 2012

Table 3.12 provides a survey of the present ecological state, based on the various biological quality elements to be examined for the adjacent coastal and transition waters of one and the same type.

The ecological state’s follow-up according to the WFD is supplemented with the implementation of the MSFD.

Consequently, for the French part, the MSFD follow-up is based on the WFD-related follow-up. For the medium range, this needs however to be supplemented in order to meet the new requirements translated into the MSFD’s 11 descriptors. By departing from what exists (WFD) and possibly extending the follow-up, it is examined which instant measures can be taken on a national scale. This is particularly the case for the eutrophication descriptors, pollutants and the food webs. Similarly, talks are being held to define the various stakeholders’ roles. In 2015, a start will be made with the monitoring program’s adjustment, which partly relates to coastal waters, and which should be operational by 2016. The emphasis will be on better follow-up of coastal and transition water bodies, including direct follow-up of every water body, and as far as possible on the integration of WFD and MSFD follow-up to come.

In Belgium, when developing the MSFD monitoring program, steps were taken to make sure that it would be as coherent as possible with the relevant assessment and monitoring stipulations decreed in the European Union’s legislation (f.i. the WFD) or pursuant to international agreements (f.i. the OSPAR recommendations and directives). That is why the MSFD monitoring program makes optimal use of the current monitoring which, to the extent possible, is copied without any changes and adjusted where necessary. Consequently, the same indicators and objectives are used for both the WFD and the MSFD.

In the Netherlands too, to develop the MSFD monitoring program, the utmost consideration has been given and optimal use has been made of the EU monitoring programs (WFD and Natura 2000) as well as OSPAR: a one-off data collection for multiple use. By doing so, the amount of complementary parameters on top of the existing monitoring has been kept to a minimum. The indicators and the objectives, however, are not necessarily identical for MSFD and WFD. For eutrophication in an MSFD context, for example, the OSPAR-COMPP methodology has been used, as it concentrates more on the marine environment than the DCE assessment. Similarly, pollutants are measured in the most appropriate segment (biota for non-polar substances and water for polar substances). It is nonetheless the aim to reduce the differences between MSFD-based and WFD-based assessments to a minimum.

Table: T3.3.2_ib: Current state of the various biological quality elements for the adjacent coastal and transition waters of one and the same type.

4. Coordination of the environmental objectives

The WFD requires the member states to strive for a good state in all water bodies. For that purpose, groundwater needs to meet, on the one hand, the criteria for the chemical quality and the quantitative criteria. On the other hand, surface water needs, for the same purpose, to meet the quality requirements for biology, physical-chemical parameters sustaining the biological quality, as well as environmental quality standards for chemical substances. Tests need to ascertain whether the quality requirements for hydromorphology based on observations regarding the lateral and longitudinal ecological continuity, the minimum flow and the riparian forest,... are met.
For waters categorized by the WFD as strongly modified or artificial, the good ecological state is often not achievable. Adjusted objectives, identified by the directive as the good ecological potential, are to apply there.

Special attention also needs to be given to the correlation between the state of surface water and the groundwater state, particularly in the Scheldt district, where watercourses have a lowland river regime, with limited flow rates, yet with an almost continuous exchange between surface and groundwater.

The surface water state and the groundwater state are indeed inextricably linked to each other when it comes to quantity and quality. In periods of drought, the surface water bodies’ basic drainage is assured by groundwater. During heavy rainfall, however, floods of surface water may have a negative influence on groundwater’s quality and quantity. In certain geological conditions (for example: the Somme in France), a rising water table after a long period of rainfall may cause floods.

For that reason, surface water and groundwater are also interlinked in terms of management. To illustrate this, the demand for sufficient drinking water can be satisfied by surface water extraction at one time, and by groundwater extraction at another.

Beside this technical coherence, there is also a policy-related link. To achieve the good state of aquifers in terms of quantity as well as of quality, there needs to be, in certain cases, a changeover from groundwater to surface water extraction. For the groundwater bodies in the Basement and Carboniferous Limestone, for instance, some exploitation run-down programs are already being applied. Due to a lack of achievable alternatives, success can only be guaranteed as long as sufficient surface water of a satisfactory quality (Yser, Lys, Scheldt) is available as an alternative source.

Member states should aim at achieving the environmental objectives in 2021. Under certain conditions, an extension up to 2027 may be asked for. Under certain conditions, it is also possible to set less strict objectives, for example if the process of achieving the objectives has a disproportionally high cost.

These environmental objectives will need to be coherent, and tuned in to the objectives of the other European directives related to water, particularly the objectives of the flood risk management directive and the framework directive for the strategy regarding the marine environment.

Within the framework of art. 10 of the FMSD, the member states defined a number of environmental objectives in 2012. These environmental objectives must allow member states to achieve or maintain a good environmental state of their marine environment by 2020.

The ISC Parties took into account the fact that the environmental quality standards must be considered as ecological and chemical quality standards in order to achieve the good state for surface water bodies, and chemical quantity and quality standards in groundwater bodies. The objectives to reach the good ecological state are discussed a bit further down in chapter 4.4.

4.1 Environmental objectives for transboundary groundwater bodies

The WFD’s environmental objectives regarding groundwater have several facets:
- Achieving a good quantitative state for the groundwater bodies, and
- Achieving a good chemical state for the groundwater bodies;
- Furthermore, the current state may not deteriorate, and it is advisable to reverse the rising trends, if any, of pollutant concentrations.
- Special attention must be given to the exchange between groundwater and dependent aquatic and terrestrial ecosystems.

The competent authorities define the environmental objectives for every water body, thereby taking into account the WFD’s stipulations and the daughter directive for groundwater (Dir. 2006/118/EC).

In regard of the good state of groundwater, the environmental objectives must comply with quality standards (for nitrate and pesticides) and thresholds. The thresholds were fixed by the Parties towards the end of 2008, taking into account, whenever necessary, the geochemical background values.

The international coordination within the Scheldt district comprises the exchange of information and experience on methods and their use as well as harmonization, f.i. when fixing the thresholds. Besides, all parties have had consultations in order to respond optimally to the questionnaire meant to define the thresholds and that was presented to the member states by the European Commission. The answers to the European Commission’s questionnaire are to be found on the following site of the European CIRCA: [https://circabc.europa.eu](https://circabc.europa.eu)

Each party’s estimation of the chemical and quantitative groundwater state has been compared by making a survey of the groundwater bodies belonging to transboundary aquifers. This survey has been made up by using common categories presenting, beside every water body’s name and title, its quantitative and chemical state, as identified by every party. Those documents are quite important in the framework of transboundary management of water resources, revealing the differences in state assessments, for example for the Palaeocene sand (Thanetien). Palaeocene sand is indeed considered in France to be in a good quantitative state, whereas in Flanders the quantitative state is considered to be bad, since it is intensively utilized in Flanders.

Coordination has particularly focused on the water bodies belonging to transboundary aquifers. Let us consider for example the carboniferous limestone, in which the recovery of the quantitative state, i.e. the rising water table, may entail chemical effects, one of them being sulfate, manganese, iron and nickel concentrations, and to a lesser degree dissolved fluorine in groundwater.

Map C3.1.2.ib: chemical and quantitative state 2021 for groundwater bodies – Level I
Map C3.1.2.ic: chemical and quantitative state 2021 for groundwater bodies – Level II
Map C3.1.2.id: chemical and quantitative state 2021 for groundwater bodies – Level III
Map C3.1.2.ib: chemical and qualitative state 2021 for groundwater bodies – Level I
Map C3.1.2.ic: chemical and qualitative state 2021 for groundwater bodies – Level II
Map C3.1.2.id: chemical and qualitative state 2021 for groundwater bodies – Level III

4.2 Environmental objectives for fresh surface water

4.2.1 Biological quality elements

Depending on the surface water body’s category, the biological quality elements are assessed by the member states on the basis of the following parameters;

- Phytoplankton;
- Macrophytes and phytobenthos;
- Benthic invertebrate fauna (macro invertebrates);
- Fish (ichtyofauna).

General findings:
Parties have been found to have several difficulties in defining the good biological state:

- There are no undisrupted reference locations in the Scheldt district. On those locations where the impact is at its lowest, the pressure is still not to be neglected so they cannot be used as reference locations as meant by the WFD in order to determine the reference condition;
- In the absence of reference locations, certain parties have reconstructed reference values;
- In some cases, but a few inventory data are available;
- The presence of invasive exotic species;
- The quality elements followed up for biology differ from one party to another;
- The sampling methods differ;
- Parties use different analysis and assessment methods, based on expert judgment;

Approaches are different when it comes to biology, which may even persist after intercalibration\(^{11}\). This goes, for example, for France and Wallonia whose indexes are the same (IBGN). This may cause the assessment of the condition to be different in certain cases anyway. This also applies to the physical-chemical aspects.

In addition, the measuring strategies and frequencies may just as well lead to differences in the assessment of the condition.

The assessment methods differ from one Party to another: some (Wallonia, the Netherlands, France) consider several years, whereas others (Flanders and Brussels) take the most recent year.

Table 4.2.1.a presents a survey of the scientific methods used by the various parties in the Scheldt district to assess the various biological quality elements in fresh surface waters. For each biological quality element, the table also provides the methodology used for the intercalibration on an European scale.

When comparing the class boundaries, it is also important to take into account the differences existing between the various types of watercourses. This is done by means of ‘comparable’ types.

Table 4.2.1.b shows the comparison, based on comparable types, of the assessment methods and boundaries applied to the classes ‘good state’/‘very good state’ by all parties, as well as all biological quality elements. These methods are now based on the second intercalibration decision (Commission Decision of 20 September 2013, Official Journal of the European Union, 8 October 2013; see bibliography).

Tables T4.2.1_a/b: The Parties’ assessment methods for the biological quality elements in rivers

4.2.2 Physical-chemical quality elements (parameters co-determining biology and Scheldt-relevant substances)

The WFD requires standards to be defined for chemical and physical-chemical parameters that co-determine the biological parameters in case these have not been defined on a European level. Depending on the type of water body, the following parameters are followed up:

- General biology sustaining parameters (water temperature, oxygenation conditions, salt content, condition of acidification, nutrients concentration)
- Specific pollutants

Based on the coordination filing cards, it can in addition be stated that, for the physical-chemical aspect, there are several elements that may lead to a different assessment:
- The selection of parameters to be used for the formal assessment of the current condition. The directive recommends groups or elements such as the oxygenation condition, salt content, temperature, degree of acidity, nutrients, etc., yet no precise parameter list has been considered. Hence the differences among parties. For example: consider Nt or NO₃.
- NQE and class boundaries, considered for the selected parameters, vary from member state to member state/delegation to delegation.
- Similarly, the official testing/assessment methods of the current condition may vary. For example: summer semestral average, median, 90-percentile, average, etc... and also whether or not the tools are taken into account, etc.

For other pollutants, the substances selected and their NQE’s may differ. Also, measuring certain parameters or not and consequently considering them or not when assessing (for example: the PAH’s) may induce differences in assessing the current condition.

4.2.3 Assessment of the good ecological condition: comparison of (concept) standards
A survey of the ecological state’s objectives or standards used can be found in the triennial report (see Attachment 6.5).

General findings:
All parties have adjusted their systems of standards to meet the WFD’s requirements. There are sometimes quite big differences, both for the standards and the way these standards are expressed (90-percentile, average, absolute maximum or minimum, median, total or group standard). The various Parties’ objectives are similar for most of the general parameters: biological oxygen demand (BOD) and chemical oxygen demand (COD), dissolved oxygen, suspended matter, conductivity, chloride, sulfates and pH. As for nutrients (nitrogen and phosphor compounds), environmental quality standards are observed to differ strongly to very strongly.

4.2.4 Hydromorphological quality elements co-determining the biology

The WFD requires an assessment of the hydromorphological parameters co-determining the biological parameters.

The hydromorphological quality elements are however only decisive for the boundary between the good and the very good ecological state. Since this class boundary has so far not been achieved in the district, no further coordination has taken place on this subject.

4.2.5 Determining the good ecological potential (GEP)

In order to determine the good potential, two equivalent realistic approaches have been developed in the context of the Common Implementation Strategy (CIS), the European consultative body for the implementation of the WFD.

The first one is based on the environmental objectives of a comparable natural system for which, taking into account the irreversible hydromorphological pressures related to useful purposes, an ecological potential is derived. Belgium and the Belgian regions make use of the first method.

The second approach is the Model of Prague (Kampa & Kranz, 2005 and attachment 11) based on the current state and the calculations of which take into account the effect of possible mitigating measures to come to a good ecological potential. The former method is used by almost all parties. France and the Netherlands make use of the latter method.
4.3 Environmental objectives for coastal and transition waters

The adjacent type-2 coastal water bodies in the Scheldt district have been defined as being natural water bodies, whereas the common transition waters (type 1) have been defined as strongly modified water bodies. For the various biological quality elements, this report always refers to the ambition of achieving the ecological state for the coastal waters and the good ecological potential for the transition waters.

Map C4.3: Surface water – condition

4.3.1 Determining the objectives for the ecological state

The objectives for the ecological state depend on how the biological indexes are interpreted. These indexes vary from one party to another, although the European intercalibration test is used to make efforts to harmonize the class boundaries of the various indexes.

For the parameter chlorophyll a, France has applied to the northern part of the French coast the same thresholds as the Netherlands and Belgium.

Federal Belgium, the Flemish Region and the Netherlands have worked out environmental objectives on an ecosystem level and have not based the assessment of macrobenthos solely on the presence of easily disturbed species but rather on the entire species composition. In France, environmental objectives apply globally and they are not determined for every quality element.

It should also be noted that a whole lot of specific pollutants are also part of the ecological state for which the thresholds to apply need to be harmonized.

4.3.2 Achieving the good ecological state in 2021 – assessment

I Transition waters

Quite some uncertainties subsist regarding the quality improvement to be expected.

In the Flemish and the Dutch transition waters, the unnatural hydromorphological adjustments are necessary to ensure flood risk management and for their main function, which is navigation. Taking into account these usages, many efforts will be made to maximize the ecology quality gain. A bilateral commission, the Flemish-Dutch Scheldt Commission (VNSC) has been charged with the setup of the Scheldt estuary to optimize flood protection, to ensure sustainable socio-economic development and protection of the natural environment.

II Coastal waters

The coastal waters have been eutrophicated. A high number of streams that are part of other river basin districts discharge into the North Sea’s southern bay, which makes it difficult to delineate the exact share of the Scheldt district in the eutrophication issue.

In articles 4.4 and 4.5, reference is made to technical unfeasibility and disproportionate costs. These terms are not explained any further, and so every party to the treaty has interpreted them differently. Within the ISC, information has been exchanged on how parties interpret the concept of ‘disproportionate costs’.

In France, as well as in Belgium and the Netherlands, most coastal waters are expected not to reach the good state in 2021 for the quality element phytoplankton.
The models currently available (Lacroix – BMM, Lancelot-ULB Menesguen – IFREMER) show that a nutrient reduction, and particularly of nitrogen, is required to enhance a significant effect on the marine environment.

Scenario modelling has shown that the implementation of the measures required to reduce nitrogen and phosphor can diminish phytoplankton concentration (primary production) in coastal waters below the value of 15 µg/l. Nevertheless, the relation between nitrogen and phosphor, a determining factor for *phaeocystis* bloom, also needs to be taken into account. That is why phytoplankton will probably continue to reflect a disruption in the coastal waters’ natural balance, in spite of considerable efforts.

The ongoing European EMoSEM study is supposed to specify the necessary nitrogen and phosphor reduction at the estuaries, a condition contributing to the good ecological state to be achieved. It allows the impact estimation of the various nutrient reduction scenarios in the river basins, by considering particularly the programs of measures related to agriculture and urban wastewater.

Table T4.3.2 presents an overview of the likelihood of reaching the good state by 2021 in the transboundary coastal and transition waters. In France, the risk of not achieving the environmental objectives is assessed for the chemical and ecological condition of water bodies. That risk is not assessed in detail, as can be seen in this table (quality element level). The items referred to here for France only reflect the current state of the quality element.

*Table T4.3.2. Overview of the likelihood of reaching the good state by 2021 in the transboundary coastal and transition waters.*

<table>
<thead>
<tr>
<th></th>
<th>Macrobenthos in coastal waters/</th>
<th>Macrobenthos in transition waters/</th>
<th>Macrophytes in transition waters (=salt marshes/)</th>
<th>Fish in transition waters/</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td></td>
<td>Index not yet defined on a national scale /</td>
<td>Not applicable/</td>
<td>Ongoing analysis /</td>
</tr>
<tr>
<td>Belgium/Flanders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Achieved by 2021:  
Not achieved by 2021:

**4.3.3 Achieving the good chemical state in 2021 – assessment**

For most priority substances, with the exception of PAHs and/or TBT, no problems are expected.

**4.4 Coordination of deviations**
The WFD provides a number of potential exceptions related to achieving the objectives in 2015. If the conditions of these potential exceptions are met, this is not considered to be a violation of the WFD, even though the objectives have not been reached.

Articles 4.4 (term extension) and 4.5 (less strict objectives) discuss the technical unfeasibility and disproportionate costs. These terms are not explained any further, which is why every party to the treaty has interpreted them differently.

Within the ISC, information has been exchanged regarding how parties have dealt with the term ‘disproportionate costs’.

The Artois Picardie basin (French part of the Scheldt district) has chosen to define less stringent objectives for some water bodies, some of them being transboundary water bodies. The pressure exerted on the water bodies involved (high population density, many agricultural and/or industrial activities) is indeed disproportionate compared to their attenuation capacity (low flow rate).

These less stringent objectives will be established thanks to the modelling of water quality as a result of all technically and financially affordable measures implemented. The deadline for these less strict objectives is 2027.

The Belgian and the Dutch part of the Scheldt district have chosen, for the transboundary water bodies involved, not to ask for a deviation in their management plans 2016-2021, in terms of a less stringent objective, but rather to postpone the achievement of objectives regarding the good state or the good potential until beyond 2027.

4.4.1 Bilateral coordination of deviations

Coordination has been limited to consultations on transboundary water bodies – see the above overview. A more detailed result of these consultations can be found in the transboundary filing cards.

4.4.2 Coordination on the analysis of disproportionate costs

The WFD’s article 4.4.a.ii mentions disproportionate costs of the program of measures to be one of the potential reasons for not reaching the WFD’s objectives beyond 2015. All of the Parties in the Scheldt river basin district have made a cost-benefit analysis for their programs of measures. The methods and the criteria that they applied differ from one Party to another.

In France, analyses of disproportionate costs (costs and benefits) are made on the most relevant scale (an internal choice) so as to take into account the fact that the costs arising in an upstream water body may produce benefits in a downstream water body. The results are nevertheless adjusted on a water body scale.

In view of the uncertainties when calculating the CBA, the Ministry of Environment argue in favor of remaining within a margin of 20% when comparing costs and benefits. That is why the benefit / cost ratio needs to be below 0.8 to substantiate a conclusion that costs of additional measures be disproportionate with regard to the total amount of benefits. In case that ratio exceeds 0.8, yet a cost split per sector, with or without funding, shows that the costs are higher than what users are able to contribute, costs will just as well be disproportionate. Figure x provides a survey of this method.
Figure 4.4.2: costs-benefit analysis in France

In the Netherlands and in the Brussels Capital Region, analyses have been made in order to come to the most cost-effective DCE measures.

For this purpose, several knowledge committees and knowledge tools have been set up and applied in the Netherlands. An example illustrating the cost-efficiency is the so-called WFD explorer. Similarly, the application of the general Dutch CA methodology in accordance with the WFD has been assessed in several studies on the occasion of the first River basin management plan.

The cost recovery for water-related services is defined in the Netherlands by the national legislation, and it always amounts to 100% (average over a number of years), covering not only the investment, but also management and maintenance costs.

The final decision regarding measures on a water body scope in a management area constitutes a democratic appraisal, effectiveness being one of its major aspects. Furthermore, spreading over time and combining measures cunningly is considered to be one of the ways to increase the affordability and effectiveness of measures.

Analyses of measures are made on the most effective scale, varying from water body to river basin.

*Water services in the Netherlands*

- Water production and supply;
- collecting and draining rainwater;
- purifying wastewater;
- groundwater management;
- water system management.

In Belgium (WL, VL, not BXL), cost-benefit analyses are made, yet no limit indicator was used, whereas France did use one. This analysis’s most relevant scale was the region. Information on benefits is also available on a water body scale, but only for the total program of measures, not for specific measures.
In Belgium (WL, BR, VL), the cost-benefit analysis went hand in hand with an analysis of the financial affordability for households, industry, agriculture and governance. Table 4.4.2 gives a survey of the method.

**Table 4.4.2: Survey affordability analysis made by the Flemish authorities**

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Affordable</th>
<th>Intermediate</th>
<th>Not affordable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Household (Expenses drinking water bill)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% available income, average</td>
<td>&lt; 2%</td>
<td>2% – 5%</td>
<td>&gt; 5%</td>
</tr>
<tr>
<td>% available income, 10-percentile</td>
<td>&lt; 2%</td>
<td>2% – 5%</td>
<td>&gt; 5%</td>
</tr>
<tr>
<td><strong>Industry</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% added value</td>
<td>&lt; 2%</td>
<td>2% – 50%</td>
<td>&gt; 50%</td>
</tr>
<tr>
<td>% turnover</td>
<td>&lt; 0,5%</td>
<td>0,5% – 5%</td>
<td>&gt; 5%</td>
</tr>
<tr>
<td><strong>Agriculture</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% added value</td>
<td>&lt; 2%</td>
<td>2% – 50%</td>
<td>&gt; 50%</td>
</tr>
<tr>
<td><strong>Authorities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% pace of increase Flemish authors</td>
<td>&lt; 2%</td>
<td>2% – 20%</td>
<td>&gt; 20%</td>
</tr>
</tbody>
</table>

11: France, the Netherlands, Flanders and Wallonia have participated in the European intercalibration tests. The BCR has not had the opportunity, yet they have always structured their biology assessment methods taking into account the Flemish and Walloon methods, that have in fact been intercalibrated.
5. Coordination of the programs of measures

Every party has made up a second program of measures in view of achieving the environmental objectives. To ensure the best possible coherence among programs of measures, this initiative has been coordinated both bilaterally and on a district scale within the ISC.

5.1 Main measures selected by the parties with regard to the water management issues

A survey of the national/regional measures of a certain significance to the Scheldt district is presented in table 5.1.

5.2 Achieving surface water of sufficient quality

i Reducing nitrate in agriculture

On an ISC scale, the various Parties’ measures meant to reduce nitrate have been listed and compared mutually, and their impact and cost have been estimated. Annex 6.7 gives a survey of the measures being taken all over the river basin.

ii Warning and exchanging information on accidental pollutions: the Warning and Alarm System for the Scheldt (WASS)

The Warning and Alarm System for the Scheldt was ratified by the Plenary Meeting on 29.10.99, in implementation of Article 51 of the Charleville-Mézières Treaty dated 26.04.94 regarding the Protection of the Scheldt. At that moment, the WASS related to only the main river of the Scheldt. In the Ghent Treaty dated 03.12.02, the so-called International Scheldt Treaty, the WASS was copied into Article 4c and extended to the transboundary tributaries in the entire Scheldt river basin district.

The WASS’s objective is to enable adequate and fast exchange of information in case of transboundary accidental pollutions, in order to avoid major environmental disasters, to protect – among other things – swimming water and avoid pollution of raw water sources. By means of monthly communication tests among main warning stations, the yearly alarm testing and the notifications of accidental pollutions, the WASS is kept operational and improved wherever necessary.

iii Restore the ecological continuity: the Scheldt Master Plan Fish

The Member states’ policy aiming at putting in place transboundary ecological corridors should give greater importance to transboundary free fish migration.

To ensure good transboundary coordination, it is important to provide effective exchange of information on innovation and current trends.

iii-1 Threats

Hydropower is more than ever a main focus to contribute to achieving the European Union’s objectives in terms of production of renewable energy, yet due to the harm it does to migrating fish, it has a tremendous downside. Only fish-friendly turbines are acceptable.

In Flanders, which is mainly located in the Scheldt river basin district’s flattest area, large-scale production of hydropower - along with the harm it does to fish - is but slightly developed.

From a financial point of view, restoring free fish migration entails a high cost for the several managers and/or local project leading stakeholders. In this respect, it is of major importance to bring
into play all possible international financial resources, particularly the Interreg and Life funds and the European fishery fund.

**iii-2 Opportunities**
- Restoring the ecological continuity in transboundary watercourses requires the coordination of the various water managers. This implies optimal coordination of efforts and the concrete effects in the field.
- Taking advantage of heavy maintenance of engineering works in order to cut the cost of making them passable for fish.
- Avoiding new obstacles to arise when building infrastructure projects such as dams, turbines, pumps,...

**iii-3 Recommendations**
- Pursue efforts in favor of free fish migration by looking for adequate funding (new funding models, particularly European aid);
- When developing hydropower, make sure turbines are fish-friendly;
- Stimulate regular exchange of information and knowledge;
- Consider determining maximum cumulative death rates for the entire river basin district (eel, salmonoids...);
- Come to bilateral coordination on ecological continuity.

**5.2.2 Protection of groundwater:**

The Member states’ and regions’ ambition to achieve the good chemical state for groundwater as well as rising trends for certain substances require them to implement legal regulations meant to forbid the infiltration of ‘hazardous substances’ or to reduce the infiltration of ‘harmless pollutants’. Indeed, taking into account that substances infiltrate slowly into the underground and given the inefficiency of curative measures to counter groundwater pollution, the only way to guarantee the good chemical state to be maintained or achieved is by reducing pressure in the long end.

The decisions taken, particularly in applying the nitrate directive and daughter directive 2006/118/EC dated 12th December 2006, aim at reducing direct and indirect pressure. An example would be substances of various origins appearing in groundwater and being considered as diffuse pollutions (nitrate and phytosanitary products), and other more local ones, resulting from industrial activities or urban areas through direct discharges (dumping or leaking sewage receiving household wastewater) or indirect discharges by pollutants being washed away and moved by rainwater.

The Member states and regions take measures to improve certain agricultural practices, the management of urban wastewater and rainwater and the control or even resorption of industrial pollution, particularly by sanitizing polluted soil. The place and priority order of those measures depend on whether or not the groundwater body has a natural protection.

To reach a good quantitative state, there should not be any further extraction of water quantities exceeding the aquifers’ refilling capacity, and also by taking into account the refill of dependent, associated aquatic and terrestrial ecosystems. This may have an influence in case of bad supply to draining watercourses or a downward trend in piezometers, or, last but not least, in case of recurring conflicts on water.
5.2.3 Upgrading water experience

Information, raising awareness and environmental education are, in this respect, vital steps. They allow the public and water actors to acquire the necessary knowledge so that they do not only adapt water consumption, but this also allows them to provide a well-considered contribution to environmental sustainability. Full awareness of the public is of paramount importance for successful actions to be taken in view of the WFD objectives.

These three keynotes require knowledge to be shared and made accessible to everyone. Environmental sustainability is meant to supply, by means of pedagogical tools, knowledge about several aspects of the environment, viz. governance, values, functioning, the means to maintain their quality. It contributes to making every citizen aware of how to safeguard a responsible approach.

Numerous media can be used to reach a broad public: website, events (Scheldt week), …

5.2.4 Improving the quality of coastal waters

Eutrophication originates mainly from the continent (inflow from industry and agriculture via rivers). Likewise, pollution by hazardous substances largely emanates from inland sources. These aspects are significantly dealt with by the WFD. The implementation of the measures provided by the WFD should have a significant impact on the quality of the marine environment.

It is important as well to ensure coherence and synergy between the measures implemented for both the WFD and the MSFD. Complementary to these measures, the Parties at the ISC also wish to:

- Exchange and assess quality data on eutrophication (phenomenon of algal bloom), particularly via satellite;
- Exchange on measures taken to reduce floating litter;
- Exchange and assess quality data on sediment;
- Continue updating data on biological quality.

5.2.5 Analyzing the measures’ cost-effectiveness

Throughout the years, a catalogue of measures (CM) has been elaborated for the purpose of comparing the various parties’ measures, learning from each other and, whenever necessary, improving coordination. Initially, the measures set out in the different river basin management plans were listed. This led to the conclusion that the various parties had elaborated the measures on another detail level, so that it was very difficult to compare the measures, their cost and effects, if at all available.

This is why the catalogue of measures has been revised. On the one hand, the aim is to provide a survey of the measures related to the main issues and implemented in the river basin district. The parties’ measures were therefore not copied literally but rather reworded in order to allow mutual comparison. This exercise was carried out for nitrate-related measures, and it was followed by a rudimentary estimation, by means of expert judgment, of a measure’s effectiveness and cost.

Gaining insight into the cost and effects of measures remains however hard to do. Charging cost-effectiveness requires measures to be worked out further, with a more detailed focus ranging from general measures to measures developed specifically for a certain area. The measures’ efficiency is
indeed compared to concrete objectives. These objectives have been defined area-based and they depend on the type of watercourse.

The method of charging cost-effectiveness varies from one Party to another. The working group ‘Economic analysis’ is involved in an initial exercise meant to charge one single measure’s cost-effectiveness for a limited number of comparable water bodies by using the Parties’ various methods.

If this exercise supplies useful results, it can be extended to cover other issues/measures and water bodies, in the long run possibly shifting the focus to transboundary water bodies.

5.2.6 Fighting floods

A separate RR has been worked out for the implementation of the FRD (ODB1-PFP1 ROR-DRI DEF.pdf). The measures spelled out in the FRD RR are screened for their positive or negative effects according to the WFD. Assessing these effects was laborious, since the measures had been phrased on a high abstraction level. To illustrate this, the example of a storm-water balancing tank’s effect can be used. Its effect on the WFD is indeed determined by whether this storm-water balancing tank merely consists of a concrete construction, or ecological usage of the storm-water balancing tank was a realistic option. In certain cases, a particular measure may consequently produce both a positive and a negative effect.

It is therefore advisable to assess effects on a local scale, viz. on the level of the bilateral files made up for transboundary watercourses.

5.2.7 Reducing the negative effects of climate change to a minimum

An initial exploratory climate memorandum has been made up, discussing the issues of drought and water scarcity.

Particularly periods of lower surface water drainage will be more frequent and last longer. This means that, more regularly than is the case now, user functions such as water use for agriculture, industry, electricity companies (cooling water) and drinking water production will be restricted. The higher water temperature in periods of strong heat will also influence the aquatic ecosystem.

The impact of a decreased water volume can be noticed in that certain pollutants’ concentration rises, which may lead to a deterioration of the ecological state of a surface water body.

Aquifers might gradually be under even higher quantitative pressure.

This issue needs to be mapped out even better on a district level. After that, actions and measures could be recommended in order to limit effects of drought and water scarcity.

5.2.8 Assess the effects of climate changes on ‘freshwater ecosystems’ and on several types of water usage

Information on the several potential scenarios has been exchanged. Now is the time to assess the effects and the common measures. Recommendations regarding climate change are still in the pipeline.

A number of aspects of climate change effects are being preconceived:

- More frequent heat waves in cities, entailing particularly the risk of extreme heat (and so an increasing water use);
- More frequent and longer droughts in summer, so that pollution concentrates in watercourses and surface water resources go down and/or deteriorate;
- The high sensitiveness of humid areas for temperature evolution and water supply (increased vulnerability, mainly in humid areas depending on rainfall).

5.2.9 Ensure better transboundary governance

The ISC has set out to ensure better governance, most of all at borders, to achieve maximum coherence in terms of characterization, monitoring, defining objectives and the implementation of programs of measures for surface water and groundwater bodies located at the border. It was in this context that standardized files were systematically developed for the purpose of transboundary coordination all across the Scheldt district.

I – Files on surface waters

Files for transboundary watercourses were developed and filled out in the course of 2014.

They are very useful working tools that allow describing in full details all relevant factors related to the quality of the surface water bodies and consequently showing similarities and differences.

They are quite complete and for every transboundary watercourse, they always describe the situation for every Party whose territories it crosses. They are a working tool for the technical experts of the various Parties, allowing them to exchange orderly and univocally detailed information on a water body scale. The contents of the files may evolve continuously, as they are ‘work in progress’. They have no formal status and must not be used for those purposes.

In general, it can be said that, even though many (small and technical) differences in objectives and assessments have been found by means of the files, the global appreciation of the watercourse’s quality is coherent across borders. A watercourse in bad condition does not all of a sudden switch conditions to good at the other side of the border. Differences are rather due to several, small variations.

Through the files, Parties take note of the measures planned by the other Parties for the transboundary watercourse involved. This implies a strong focus on interventions liable to influence another Party with regard to:

- New sources of pollutions or resolving existing bottlenecks (f.i. construction of sewage system/connection to wastewater treatment plant)
- Creating or resolving fish migration bottlenecks
- Creating or resolving hydraulic bottlenecks with an impact on flood risks.

li – Files on transboundary aquifers

In the course of 2014, the Groundwater Project made up descriptive files for the coordination of groundwater bodies belonging to transboundary aquifers. These files allow a standardized exchange of the available information. Presently, the files are not meant to determine methodologies or even discuss harmonization of the threshold values. Every Party keeps their independence as for the contents of their own descriptive files, which are often more complete, and remains responsible for their research, classification and diagnosis methods.

13 For transboundary watercourses crossing several Parties’ territories, efforts have been taken to treat these in a single file (f.e. Scheldt, Senne, Canal Brussels-Charleroi) in order to reduce the total number of files to a minimum. These files are in A3 format, as several Parties are treated in one single file.
The files deal with:

- The characterization of the water bodies
- The quantitative and qualitative assessment of the present state
- The overall condition of the water bodies
- Environmental objectives
- The program of measures

The coordination files were initially filled out by the various Parties within the scope of the RR WFD2. An initial coordination exercise has been launched within the Groundwater project. By 2021, consultation needs to be put in place regarding the divergent approaches in terms of sampling methods, the way to come to a diagnosis and long term perspectives regarding the water layers’ condition. In the future, homogenization of the files is to continue, and they will constitute a coordination tool among parties.

5.2.10 Data, measuring methods and assessment methods

After the implementation of the 1st management plan, all measuring data and methods of the various district parties were homogenized by the European Union, so that today priority substances and analyzing methods have now been standardized and harmonized. In the context of the HMS, member states see to it that key elements, such as homogenization of the collecting and analyzing protocols of measuring data, be standardized. The WASS allows spreading of standardized warning messages in case of accidental pollutions. The exchange of flow data in case of floods and drought is coordinated by the ISC.

Several data bases: ‘physico-chemical quality of the HMS’ by the Agence de l’Eau Artois Picardie, ‘HMS biology’ by the VMM, ‘GIS Scheldt district’ (cartography) by DGARNE, Scaldit, ScaldWIN and the ISC, are exchanged.

Still, approaches, objectives and assessment methods continue to diverge. As soon as a lack of coherence on both sides of the border has been spotted, it is discussed. Ensuring data coherence across border territories thanks to files made up for transboundary coordination remains one of the priorities in the implementation of the second management plan. Within the scope of these activities, making up joint documents, maps and tables based on comparable and homogeneous data is an important permanent action point, as is shown in this roof report of the 2nd management plan.

5.3 Cost-effectiveness analysis of the measures

In the programs of measures of the Scheldt river basin district’s member states, two priority economic analyses are done: a cost-effectiveness analysis (CEA) and an analysis of the disproportionate costs. Upon comparing the working methods used for these analyses, one finds that there is a need for some basic definitions outlining what is to be understood by ‘effects’ and ‘benefits’. This is why the following definition has been proposed by the working group Economic analysis of the ISC:
‘Generally speaking, effects are the intended result of measures that can be compared to a specific objective of the Water Framework Directive. Benefits can be distinguished from effects by the fact that they are not limited to the intended result of a target defined by the WFD. Benefits rather cover a wider range of (mostly positive) impacts resulting from a measure, although they are not the main objective.’

For example: a reduction of nutrient supply to watercourses will contribute to reduced algal bloom and a better (more diverse) macrophyte community, which is thus to be considered as an effect within the WFD scope. Lower algal blooms however also reduce the negative health effects in swimming water. This can be seen as a benefit according to the above definition, even though swimming without health risks is no explicit WFD objective.

Annex III of the Water Framework Directive imposes a cost-effectiveness analysis to be included in the program of measures. Table 5.3 provides a survey of the information used for the cost-effectiveness analysis done by the various Parties in the Scheldt river basin district. For costs, effects and finally cost-effectiveness, it is specified whether quantified information was used or estimation was done on the basis of expert judgement. Costs were split into investment costs and maintenance costs. Effects were merged into 3 major groups of measures: water quality, sediment and hydromorphology. A group was added for all other possible groups of measures. The combination of cost-related information and effect-related information gives cost-effectiveness as a result.

The information in Table 5.3 shows that most available quantifiable knowledge relates to the costs of measures. For measures, all Parties distinguish investment costs from maintenance costs, and costs are always quantified.

Information on effects seems to be far less quantifiable, since quantifiable effects are available but for (most) water quality measures. The main reason for this is to be found in the historical development of water quality models, yet it can also be explained by the focus that legislation puts on this aspect, and to a lesser degree, for example, on hydromorphology. A strongly emerging research and policy domain (at least in NL) relates to sediment-related measures. Some Parties do research on effects in several groups of measures. For the Netherlands, flood protection is a major subject allowing to measure the effects.

From the above, it is to be concluded that the cost-effectiveness analysis is most detailed and quantified when it comes to water quality itself, and less when considering the other groups of measures.

**Table 5.3. Survey or estimation based on quantified information or on expert judgement**

<table>
<thead>
<tr>
<th>Costs</th>
<th>FR</th>
<th>WL</th>
<th>BR</th>
<th>VL</th>
<th>NL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment</td>
<td>Q</td>
<td>Q</td>
<td>Q</td>
<td>Q</td>
<td>Q + E</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>Other</td>
<td>Effects</td>
<td>Other</td>
<td>Cost-effectiveness</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------</td>
<td>-------</td>
<td>-------------------------</td>
<td>-------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td>Q</td>
<td>Q</td>
<td>Q</td>
<td>Q</td>
<td>Q + E*</td>
</tr>
<tr>
<td>Other</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water quality</td>
<td>Q</td>
<td>E</td>
<td>(Q)</td>
<td>Q</td>
<td>Q (Q)</td>
</tr>
<tr>
<td>Sediment</td>
<td>E</td>
<td>-</td>
<td>(E)</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Hydromorphology</td>
<td>E</td>
<td>E</td>
<td>(E)</td>
<td>E</td>
<td>Q</td>
</tr>
<tr>
<td>Other</td>
<td>E</td>
<td>E</td>
<td>(Q) + (E)</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td><strong>Cost-effectiveness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water quality</td>
<td>Q</td>
<td>E</td>
<td>(Q)</td>
<td>Q + E</td>
<td>q + E</td>
</tr>
<tr>
<td>Sediment</td>
<td>E</td>
<td>-</td>
<td>(E)</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Hydromorphology</td>
<td>E</td>
<td>-</td>
<td>(E)</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Other</td>
<td>E</td>
<td>-</td>
<td>(Q) + (E)</td>
<td>E</td>
<td>Administrative decision</td>
</tr>
</tbody>
</table>

Q = quantified, E = expert judgement, *evidence-based or by pilot project
6. Register of protected areas

Map 6.1 Groundwater intended for drinking water production
Map 6.2 Nitrate vulnerable areas
Map 6.3 Urban wastewater
Map 6.4 Birds and habitat
Map 6.5 Shellfish waters
Map 6.6 Bathing waters

The registers of protected areas according to article 6 of the WFD (1) have been set up by states and regions, each for their own territory. See chapter 6 of the RR 2009.

There are but a few protected areas requiring international (bi- or multilateral) consultation. Here below, some examples of transboundary areas on which structured consultation has taken place.

For the cooperation with reference to the Parc Naturel Régional Scarpe-Escaut, the regions Nord-Pas-de-Calais (F) and Wallonia (B) signed in 1983 a protocol of agreement meant to create a transboundary nature park. The cooperation between the Parc naturel Scarpe-Escaut and its Belgian partners was enhanced by the Interreg program. In 1996, the Parc naturel des Plaines de l’Escaut (W) was created, as well as the Parc naturel transfrontalier du Hainaut (Hainaut’s transboundary nature park).

Transboundary consultation among administrators takes place on a yearly basis.

In 2010, upon the renewal of the Charter for the Parc naturel regional Scarpe-Escaut, the Parc naturel des Plaines de l’Escaut was added, so that a global development project could be defined. It works both ways: in 2013, the Parc naturel des Plaines de l’Escaut approved its new Management plan, taking into account the French strategic choices.

Another example illustrating cooperation intended to protect groundwater layers is the transboundary project related to the Carboniferous limestone aquifer, described extensively in chapter 3 (see page 54).

Another example of transboundary cooperation refers to the transboundary Zwin area, located on the Flemish-Dutch border, on the territories of coastal municipalities Knokke-Heist (VL) and Sluis (NL). It constitutes a unique biotope of mudflats and saltmarshes.

The ZTAR project (Zwin Tidal Area Restoration) is a European Life project aiming at restoring the Zwin plain to become the biodiverse mudflats and saltmarshes area of olden days. The project started on 1st January 2011 and continued up to 31st December 2015.

A part of this project consists in digging freshwater pools, restoring breeding islands for birds, creating grazing plots and restoring the Zwin channel.

(1) Article 6, paragraph 1 of Directive 2000/60/EC
The international transboundary nature park ‘Groot-Saeftinghe’ and the reception center ‘Prosperhoeve’ constitute another example of transboundary cooperation. As a matter of fact, the ‘Verdronken land van Saeftinghe’ is extended across the Dutch/Flemish border, which gives rise to one big continuous, cross-border natural area of over 4,650 ha: ‘Groot Saeftinghe’.

The Brussels Capital Region contains a number of protected areas, located at its western borders. Whether we are talking about the Woluwe and the Soignies Forest, located in a special protected area, or about water extraction points intended for human consumption, or areas that are vulnerable to nitrate of agricultural origin, all of these are managed by the regional environmental authorities, in consultation with the Flemish Region if the situation so requires (pollution, flood, exotic species,…).

7. Information and consultation of the public

7.1 Public participation: a competence of each Party

France

The consultation of the public in France was held from 19th December 2014 to 18th June 2015, and it was about the FRD-Flood risk management plan (FRMP), the draft WFD-SDAGE, the program of measures (Management Plan), and the draft action plan regarding the marine environment (DAME) according to the MSFD.

All documents were made available to the public and to the stakeholders involved; a paper version of the plans was to be found in the prefectures and a digital one on the following website: 

http://consultation.eau-artois-picardie.fr/

The assessment approved at the end of 2013 allowed zooming in on the main challenges in terms of the water policy, particularly on the factors preventing the objectives suggested by the WFD from being achieved, for a lack of willingness to improve the situation. Those challenges, as well as the working program to work out the SDAGE and PM, were submitted to the local authorities, the consular chambers and the citizens.

For the consultation of the public, on top of the regulatory consultation spots, viz. prefectures and offices of the Agence de l’Eau and the website, 6 geographic meetings were held in the Artois-Picardie basin, intended to present the questionnaire and to debate on the water policy. Based on the challenges found during this consultation, regulations and measures were proposed during 4 local meetings in the first semester of 2014. These meetings allowed filtering out the priorities and debating on the proposals.

The results of these activities were used to draw up a draft SDAGE and a draft PM, which were approved by the Basin Committee on 5th December 2014 in view of the consultation of the public.

Walloon Region

The consultation of the public on the working program as well as on the timing was combined with the consultation on the main water management issues. This consultation took place from 16th September 2013 to 17th March 2014. The consultation on the draft plans was held from early June 2015 until early January 2016, taking into account, however, the interruptions from 15th July till 15th August and the Christmas holidays.
**Flemish Region**

Between 9th July 2014 and 8th January 2015, the draft river basin management plans for Scheldt and Meuse were submitted to a public inquiry. These plans contain measures meant to improve the condition of watercourses and groundwater and to reduce the flood risk. For a period of six months, every citizen, organization or company is allowed to consult the plans and to write down remarks or objections on the website [http://www.volvanwater.be/](http://www.volvanwater.be/).

Prior to the public inquiry, a number of consultations with the strategic advisory bodies were held. On those occasions, the methods, concepts, etc. used to make up the RVMP were clarified, and an overview of the contents of the various plan sections was given: river basin scale, basin-specific sections, groundwater system-specific section and the integration of the flood risk management plans.

On a basin scale, the ‘Comités de bassin’ — members of which are local parties and stakeholders — were involved for the creation of basin-specific sections as a part of the RBMP.

**Brussels Capital Region**

The consultation regarding the timing and the working program for the 2nd cycle of the water management plan was done simultaneously with the consultation on the subject of the water management issues. It took place from 4th December 2013 to 4th June 2014.

The public inquiry on the draft water management plan 2016-2021 takes 6 months and it comes into force after approval of the Plan by the Government at the second reading (3rd quarter 2015) from 20th November till 31st May 2016.

It will be announced by means of a notice in the Official Journal, along with a poster in every municipality of the Brussels Capital Region, and at least three French-speaking and three Dutch-speaking newspapers distributed in the Region, and also in a communiqué on radio and television.

**The Netherlands**

District water boards, municipalities, provinces and the State have cooperated intensely in working out the draft District management plan Scheldt. Through active involvement, information supply and consultation of the public, it is mainly civil society organizations and citizens that are involved in this process, on a regional, national as well as an international scale. Most of all, the area processes organized by the water managers turned out to be important in order to involve all those concerned in the wording of objectives and measures.

Within the Scheldt district, the importance of clean water has been discussed with certain interest groups, and also how interest groups can contribute to achieving the WFD objectives. In addition, the set of measures to be implemented from 2009 to 2027 has been defined.

The public participation is also intended to maintain support for the implementation of these measures.

The formal submission for inspection of the national and roof report of the draft river basin management plan Scheldt took place from 23rd December 2014 until 22nd June 2015. During this period, the documents were physically available in all County Halls and at the Ministry of Infrastructure & Environment. On top, the documents could be found on the website: [http://www.platformparticipatie.nl/projecten/alle-projecten/projectenlijst/nationaal-waterplan/index.aspx](http://www.platformparticipatie.nl/projecten/alle-projecten/projectenlijst/nationaal-waterplan/index.aspx)
7.2 Coordination within the International Scheldt Commission

On a Scheldt district scale, the public participation (implementation of art. 14 paragraph 1 WFD) is a competence of the States and Regions. Since 2003, the ISC has been welcoming non-governmental observers at all of their technical work meetings and at the Plenary Meeting. By doing so, the ties with stakeholders and civil society are tightened while carrying out the ISC tasks (see observer list – annex 3).

Within the ISC, the Parties hold mutual consultation on the RRMP. This allows them, case need, to harmonize the national and/or regional programs of measures.

See WFD text on consultation of other authorities.

7.3 Results of the public consultation on the roof report

The ISC has not received any particular remarks on the occasion of the public consultation that was organized by the Parties.

MAP LIST

- C1.1 Competent authorities that are competent in the WFD implementation in the IRBD Scheldt
- C2.1.2: Main watercourses
- C2.1.2 vii-1: Population density
- C2.1.2 vii-3a: Evolution in the utilized agricultural area (%HU) from 2004 up to 2012
- C2.1.2 vii-3b: Evolution of livestock between 2004 and 2012
- C2.1.2 vii-3c: Soil use 2006
- C2.1.2 vii-3d: Soil use 2012
- C2.1.3 i: Hydrographic units and clusters
- C2.1.3 ii: Population connected to a sewage treatment plant between 2004 and 2012
- C2.1.3 iii: Spread of the industrial sectors, trades discharging directly into surface water
- C2.1.3 iva: Net nitrogen emission into surface water
- C2.1.3 ivb: Net phosphor emission into surface water
- C2.4.1 ia: Groundwater bodies – level I
- C2.4.1 ib: Groundwater bodies – level II
- C2.4.1 ic: Groundwater bodies – level III
- C2.4.2 ia: Comparable types of surface water
- C2.4.2 ib: Surface water – types and categories
- C3.1.1 Measuring network for monitoring of the quantitative and the chemical state of the groundwater bodies
- C3.1.2 ia1: IRBD Scheldt – transboundary aquifers: groundwater quality assessment – Nitrate
- C3.1.2 ia2: IRBD Scheldt – Transboundary aquifers: groundwater quality assessment – Pesticides
- C3.1.2 ib: chemical and quantitative state 2007 of groundwater bodies – Level I
- C3.1.2 ic: chemical and quantitative state 2007 of groundwater bodies – Level II
- C3.1.2 id: chemical and quantitative state 2007 of groundwater bodies – Level III
- C3.1.2 ib: chemical and qualitative state 2007 of groundwater bodies – Level I
- C3.1.2 ic: chemical and qualitative state 2007 of groundwater bodies – Level II
- C3.1.2 id: chemical and qualitative state 2007 of groundwater bodies – Level III
- C3.1.2 ib: chemical and quantitative state 2012 of groundwater bodies – Level I
- C3.1.2 ic: chemical and qualitative state 2012 of groundwater bodies – Level II
- C3.1.2 id: chemical and qualitative state 2012 of groundwater bodies – Level III
- C3.1.2 ib: chemical and quantitative state 2021 of groundwater bodies – Level I
- C3.1.2 ic: chemical and quantitative state 2021 of groundwater bodies – Level II
- C3.1.2 id: chemical and qualitative state 2021 of groundwater bodies – Level III
- C3.1.2 ii: Groundwater bodies related to the Carboniferous/ Salt water intrusions
- C3.2.2a: Ecological state surface water
- C3.2.2b: Chemical state surface water
- C3.2.2c: Chemical state surface water – without considering the ubiquitous substances
- C3.2.2 iii: Low water map – August 2013
- C3.3.1: Coastal waters monitoring
- C4.3: Surface water – State
- C6.1: Protected areas – water intended for human consumption
- C6.2: Protected areas – nitrate
- C6.3: Protected areas – urban wastewater
- C6.4: Protected areas – birds and habitat
- C6.5: Protected areas – fishing ground and shellfish water
- C6.6: Protected areas – swimming areas

LIST OF TABLES
- T2.1.3 ii PA4a PFEL-ODA PA4A tab carte 8 20141028
- T2.1.3 iva PA4a PFEL-ODA PA4A tab carte N 20141028
- T2.1.3 _ivb_PA4a_PFEL-ODA_PA4A_tab carte P_20141028
- T2.1.3 _ivc_PA4a_PFEL-ODA_PA4A_tab carte 10_20141028
- T2.1.3 ix PA4a Estimated pressure intensities of relevant sources
- T2.1.3 x. The groundwater volumes granted or extracted in 2012, including those intended for drinking water distribution
- T2.1.4 iii Recovery rates for the water services taken into account by all Parties
- T2.4.1 I PA5 STATE transboundary aquifers 2012
- T2.4.1 ii PA4a Border water bodies
- T3.1.2 I Assessment survey of the groundwater bodies’ chemical and quantitative states, from 2007 up to 2021
- T3.3.1 I PA4b MONITORING PROGRAMS FOR THE COASTAL AND TRANSITION WATERS
- T 3.3.2 ia Priority substances
- T3.3.2 ib PA4b CURRENT STATE BIOLOGICAL QUALITY ELEMENTS IN COASTAL AND TRANSITION WATERS-rev2015
- T4.2.1 i: The Parties’ assessment methods regarding biological quality elements in rivers
• T4.3.2: Probability survey in view of achieving the good state in 2021 for transboundary transition waters in the district
• T4.4.2: Survey of the affordability analysis for the Flemish authorities
• T5.1: Summary of the programs of WFD measures, 2nd cycle
• T5.3: Survey specifying whether the estimation is based on quantified information or on expert judgment.

LIST OF ATTACHMENTS

1. National or regional management plans
2. List of competent authorities
3. Observers at the ISC
   3.1 Intergovernmental organizations
   3.2 Non-governmental organizations
4. Coordination files
   4.1 Surface water
   4.2 Groundwater
5. Table showing the national / regional measures of significance to the Scheldt district
6. The ISC’s reading list
   6.1 RRMP flood risk directive
   6.2 Roof report 1st survey
   6.3 Roof report 1st Management plan
   6.4 1st strategic memorandum on climate change adaptation
   6.5 Triennial report 2011-2013
   6.6 Master plan fish Scheldt
   6.7 Table of measures aiming at reducing nitrate produced by agriculture
7. The Parties’ reading list
   7.1 France
   - SDAGE (Schéma d’aménagement et de Gestion des Eaux) http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000330631&categorieLien=id
     - PoM (program of measures)
       http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000330631&categorieLien=id
     - MP (monitoring program) and the decree thereupon: http://www.legifrance.gouv.fr/ affichTexte.do?cidTexte=JORFTEXT000021865259&dateTexte=&categorieLien=id
     - Documents accompanying the SDAGE EdL (survey)
     - Flood directive: http://www.legifrance.gouv.fr/ affichTexte.do?cidTexte=JORFTEXT000021865259&dateTexte=&categorieLien=id
- The SAGES of the Artois-Picardie basin: [http://www.gesteau.eaufrance.fr/outils-de-gestion?rech_admin=ARTOIS-PICARDIE%20%5Bcode:01%5D%5Btype:circconscription%5D](http://www.gesteau.eaufrance.fr/outils-de-gestion?rech_admin=ARTOIS-PICARDIE%20%5Bcode:01%5D%5Btype:circconscription%5D)

### 7.2 Walloon Region
- Website on the management plan for each specific river basin district in Wallonia, [http://eau.wallonie.be](http://eau.wallonie.be)

### 7.3 Flemish Region
- Draft management plan Flemish part of the international Scheldt river basin district, CIW, 2014 ([www.integraalwaterbeleid.be](http://www.integraalwaterbeleid.be))
- Draft Program of measures joined to draft management plans for the Flemish parts of the Scheldt and Meuse river basin districts, CIW, 2014 ([www.integraalwaterbeleid.be](http://www.integraalwaterbeleid.be))

### 7.4 Brussels Capital Region
- Ordinance dated 20th October 2006, outlining a framework for the water policy
- Government decree of the Brussels Capital Region dated 10th June 2010 regarding groundwater protection against pollution and deterioration;
- Government decree of the Brussels Capital Region dated 24th September 2010 on flood risk assessment and management, as modified by the government decree dated 28th March 2013;
- Government decree of the Brussels Capital Region dated 24th March 2011, defining the basic quality standards and the chemical standards for surface waters, to fight pollution caused by certain hazardous substances and other pollutants;
- Government decree of the Brussels Capital Region dated 22nd December 2011, defining technical specifications for the chemical analysis and monitoring of the water condition;
- Ordinance dated 1st March 2012 regarding nature conservancy;
- Government decree of the Brussels Capital Region dated 12th July 2012 approving of the Brussels Capital Region’s water management plan;
- Royal Meteorological Institute of Belgium (RMI), Vigilance climatique (= Climate watch), final report, 2008, 60 p.;
7.5 The Netherlands
- [www.emissieregistratie.nl](http://www.emissieregistratie.nl) Tab ‘emissies’ and ‘details van de berekeningen’ under the tab ‘documenten’.
- Visser A and E van der Wal. 2014. Evaluatie monitoring gewasbeschermingsmiddelen. CLM850.

7.6 Federal Belgium

7.7 European directives
- WFD
- Groundwater directives
- Intercalibration

LIST OF ABBREVIATIONS
- BEQI Benthos Ecosystem Quality Index
- BOD Biological oxygen demand
- CCNR Central Commission for the Navigation of the Rhine
- EPER European Pollutant Emission Register
- EQS Environmental quality standards
- FRD Flood risk directive
- GEP Good ecological potential
- HMNS Homogeneous monitoring network Scheldt
- ICPS International Commission for the Protection of the Scheldt; in 2003 replaced by the ISC
- IMO International Maritime Organization
- ISC International Scheldt Commission
- MONEOS Monitoring effects of the Development scheme
- PAH Polycyclic aromatic hydrocarbons
- PCB Polychlorinated biphenyls
- RRMP Roof report of the management plan for the Scheldt district
- RRS Roof report of the survey
- SMWB Strongly modified water bodies
- SWC Ship waste convention on the collection, the storage and the reception of waste coming from Rhine and inland navigation, established in Strasbourg on 9th September 1996
- TBT Tributyltin
- WASS Warning and Alarm System for the Scheldt
- WFD Water Framework Directive
ATTACHMENT 1

Links to the national / regional river basin management plans

France:
Belgium:
Walloon Region: http://eau.wallonie.be/spip.php?article143
Brussels Capital Region: http://www.environnement.brussels/thematiques/eau/plan-de-gestion-de-leau/enquete-publique-projet-de-plan-de-gestion-de-leau-2016-2021
Flemish Region: www.volvanwater.be
ATTACHMENT 2

Competent authorities

France

The coordinating Prefect of the Artois-Picardie basin
2 Rue Jacquemars Giélée
59039 Lille Cedex

Belgium

Federal Government of Belgium
Directorate General Environment
FPS Public Health, Food Chain Safety and Environment
Place Victor Horta 40 POB 10
1060 Brussels
http://www.health.fgov.be

Walloon Region

Walloon Government
Prime Minister
Rue Mazy 25-27
5100 Namur

Brussels Capital Region

Government of the Brussels Capital Region
Minister-Chairman
Rue ducale 9
1000 Brussels

Flemish Region

Co-ordination committee Integrated Water Policy (CIW)
Van de Maelestraat 96
9320 Erembodegem
http://www.integraalwaterbeleid.be

The Netherlands

Secretary of State for Transport
POB 20906
2500 EX The Hague
http://www.minvenw.nl
# ATTACHMENT 3

## LIST OF OBSERVERS AT THE ISC

<table>
<thead>
<tr>
<th>Governmental observers</th>
<th>Email/Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Escaut sans Frontières / Grenzeloze Schelde <a href="http://www.grenzelozeschelde.be/">http://www.grenzelozeschelde.be/</a></td>
<td>Dolores Baita <a href="mailto:baita@gs-esf.be">baita@gs-esf.be</a></td>
</tr>
<tr>
<td>Cefic <a href="http://www.cefic.org/">http://www.cefic.org/</a></td>
<td><a href="mailto:mail@cefic.be">mail@cefic.be</a> [<a href="mailto:sva@cefic.be">sva@cefic.be</a>] [<a href="mailto:ide@cefic.be">ide@cefic.be</a>]</td>
</tr>
<tr>
<td>Bond Beter Leefmilieu <a href="http://www.bondbeterleefmilieu.be/">http://www.bondbeterleefmilieu.be/</a></td>
<td>Mathias Bienstman <a href="mailto:mathias.bienstman@bblv.be">mathias.bienstman@bblv.be</a></td>
</tr>
<tr>
<td>GoodPlanet Belgium <a href="http://www.goodplanet.be">http://www.goodplanet.be</a></td>
<td>Jo Van Cauwenberghe <a href="mailto:j.vancauwenberge@goodplanet.be">j.vancauwenberge@goodplanet.be</a></td>
</tr>
<tr>
<td>Inter-Environnement Wallonie <a href="http://www.ielowonline.be/">http://www.ielowonline.be/</a></td>
<td>Gaëlle WARNANT <a href="mailto:g.warnant@iew.be">g.warnant@iew.be</a> <a href="mailto:secretariat@iew.be">secretariat@iew.be</a></td>
</tr>
<tr>
<td>Nord Nature <a href="http://www.nord-nature.org/">http://www.nord-nature.org/</a></td>
<td>Janine Petit <a href="mailto:petit-janinou@orange.fr">petit-janinou@orange.fr</a></td>
</tr>
<tr>
<td>Union Wallonne des Entreprises (UWE) <a href="http://www.uwe.be/">http://www.uwe.be/</a></td>
<td>Claude Dekelle <a href="mailto:Claude.dekelle@ccb.be">Claude.dekelle@ccb.be</a></td>
</tr>
<tr>
<td>Zeeuwse Milieufederatie <a href="http://www.zmf.nl/">http://www.zmf.nl/</a></td>
<td>Leo Vorthoren <a href="mailto:lvorthoren@zmf.nl">lvorthoren@zmf.nl</a> Aafke Brader <a href="mailto:abrader@zmf.nl">abrader@zmf.nl</a></td>
</tr>
<tr>
<td>Conseil Scientifique de l’Environnement Nord / Pas-De-Calais (CSENPC) <a href="http://www.nord-pas-de-calais.ecologie.gouv.fr/">http://www.nord-pas-de-calais.ecologie.gouv.fr/</a></td>
<td>Bruno de Foucault <a href="mailto:conseil.scientifique@libertysurf.fr">conseil.scientifique@libertysurf.fr</a></td>
</tr>
<tr>
<td>Environnement et Développement Alternatif (EDA) <a href="http://www.eda-lille.org/">http://www.eda-lille.org/</a></td>
<td>Anita Villers <a href="mailto:anita.villers@free.fr">anita.villers@free.fr</a></td>
</tr>
<tr>
<td>Organization</td>
<td>Contact Information</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------</td>
</tr>
</tbody>
</table>
| SAR Minaraad | [http://www.minaraad.be/](http://www.minaraad.be/)  
Dirk Uyttendaele  
[Dirk.Uyttendaele@minaraad.be](mailto:Dirk.Uyttendaele@minaraad.be) |
| Eurométaux | [http://www.eurometaux.org](http://www.eurometaux.org)  
Guy Thiran  
[thiran@eurometaux.be](mailto:thiran@eurometaux.be)  
Lucia Buve  
[Lucia.Buve@eu.umicore.com](mailto:Lucia.Buve@eu.umicore.com) |
| WYPW (World Youth Parliament for Water) | [http://www.pmje-wypw.org](http://www.pmje-wypw.org)  
Asma Bachikh  
[asma.bachikh@pmje-wypw.org](mailto:asma.bachikh@pmje-wypw.org) |
Julie Van Overmeiren  
[j.vanovermeiren@goodplanet.be](mailto:j.vanovermeiren@goodplanet.be)  
Isabelle Magils  
[i.magils@goodplanet.be](mailto:i.magils@goodplanet.be) |
| PJE (Parlement des Jeunes pour l’Escaut) | Christine Dericq  
[c.dericq@eau-ardois-picardie.fr](mailto:c.dericq@eau-ardois-picardie.fr) |

**Intergovernemental observers**

<table>
<thead>
<tr>
<th>Organization</th>
<th>Contact Information</th>
</tr>
</thead>
</table>
| International Meuse Commission | Willem Schreurs  
[Schreurs@meuse-maas.be](mailto:Schreurs@meuse-maas.be)  
Paul Racot  
[racot@meuse-maas.be](mailto:racot@meuse-maas.be) |
| Benelux | Marc Naessens  
[m.naessens@benelux.int](mailto:m.naessens@benelux.int) |
ATTACHMENT 4

Both the files on surface water and the ones on groundwater are available on the ISC’s website: www.isc-cie.org