International River Basin District Meuse

Characteristics,
Review of the Environmental Impact of Human Activity,
Economic Analysis of Water Use

Roof report
on the international coordination pursuant to Article 3 (4)
of the analysis required by Article 5 of Directive 2000/60/EC
establishing a framework for Community action
in the field of water policy
(Water Framework Directive)

Liège, 23 March 2005

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"International River Basin District Meuse – Analysis, Roof Report,
International Meuse Commission, 2005"

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This report is available in French, Dutch, and German.

English not being one of the IMC's official languages, the English version of this report is not an official translation and is only provided to make the report more widely available.

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TABLE OF CONTENTS

1 International Coordination within the International River Basin District Meuse

1.1 Context

The Water Framework Directive (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy), which entered into force on 22 December 2000, gives a significant new impetus to water policy and provides a legal basis for more extensive coordination within entire river basin districts across administrative and national borders.

Member States have the obligation to ensure that all activities required by the Directive in order to achieve the objectives set out in Article 4, and in particular the good status of surface and groundwater water bodies, are coordinated for the whole of the river basin district. This obligation applies in particular to establishing programmes of measures as required by Article 11 and river basin management plans in accordance with Article 13.

In implementing the Directive, and in addition to its legal transposition into national legislation, Member States shall take the following steps:

- the coordination of administrative arrangements within the river basin district (Article 3), to be reported by Member States to the European Commission by 22 June 2003,
- an analysis of the characteristics of the river basin district, a review of the environmental impact of human activity and an economic analysis of water use, to be finalized by the end of 2004 (Article 5) and reported on by 22 March 2005 (Article 15 (2).

Although the Directive does not explicitly call for a trans-boundary coordination under the Article 5 analysis, it is obvious that such coordination is necessary in order to provide the necessary common basis for the coordination of monitoring programmes, programmes of measures and the river basin management plan. Therefore, the States and Regions sharing the International River Basin District Meuse (IRBD Meuse) agreed to coordinate their activities on the Article 5 analysis and to produce this joint report, which highlights the results and achievements of the established coordination.

This report complements the individual reports made by the States and Regions on the results of the analysis for their respective parts of the Meuse river basin district. Competent authorities (address and phone numbers) designated in accordance with Article 3 of the Water Framework Directive (WFD) are listed at annex 1. A map of their respective territorial area is at annex 2

1.2 Multilateral Coordination for the International River Basin District Meuse

As early as November 2001, at a ministerial conference held in Liege, Ministers responsible for water from the riparian States and Regions defined the IRBD Meuse in accordance with the provisions of Article 3 of the Water Framework Directive (WFD). They also decided to produce, for the IRBD Meuse, a single river basin district management plan (IRBDMP) as required by Article 13 of the WFD. Moreover, they agreed to start negotiations for a new international Agreement in order to ensure that the necessary consolidated provisions for multilateral coordination were in place. .

On 3 December 2002, in Ghent, France, the Netherlands, Germany, Luxemburg, Belgium and its regions: the Walloon Region, the Flemish Region and the Brussels-Capital Region signed the International Meuse Agreement. This Agreement makes provisions for the international coordination in the district Meuse with a view to the implementation of the WFD and for other areas of concern, such as flood protection.

The Agreement widens the role of the International Meuse Commission (IMC) by assigning to it the task of coordinating the activities of its contracting Parties in the implementation of the WFD.

In particular, the Agreement stipulates that the International Meuse Commission has the remit of coordinating the elaboration of a single River Basin Management Plan for the entire IRBD Meuse (Article 13 of the WFD). It also refers to the coordination of the Article 5 analysis, of the monitoring programmes (Article 8 of the WFD) and of the programmes of measures (Article 11 of the WFD).

The Agreement alters neither the legal responsibility nor the competences of the Parties as EU Member States as far as the implementation of the WFD is concerned, but it establishes the necessary framework for ensuring the international coordination at river basin level as required by the WFD. Although it is likely that the International Meuse Agreement will only enter into force in 2005, it already provides the formal basis for cooperation, because of the agreement by its signatories to apply its provisions from the date of signature.

At the 2001 ministerial conference, Ministers decided to structure the IRBDMP as follows:

- one umbrella section
- sections elaborated by the States and Regions, relating to their respective territories, their sub-basins or their areas of activity.

The umbrella section was to cover those issues (e.g. results of monitoring; status classification; measures taken) that are relevant to the entire IRBD Meuse, as well as a summary of the coordination activities implemented over the whole of the IRBD Meuse. These issues need coordination between Parties at multilateral level.

The plans drawn up by the States and Regions for their territories, possibly structured according to sub-basins or to specific areas of activity, would focus on the issues that are relevant to their parts of the IRBD Meuse. Where necessary, they would be coordinated bi-laterally for the trans-boundary sub-basins or groundwater bodies.

For the sake of consistency, the States and Regions who signed the International Meuse Agreement decided to adopt the same approach for the implementation of the provisions of art 5 (1) of the WFD. Consequently, during a plenary meeting of the IMC on 28 November 2003, the States and Regions decided that:

- each Party would compile national and/or regional reports in accordance with art 5 of the WFD for its part of the IRBD Meuse;
- Parties would produce a common roof report for the IRBD Meuse to complement the national/regional reports; it would consist of a brief overview of the characteristics and relevant pressures and impacts at the scale of the district, as well as a summary of the coordination activities carried out internationally.

It should be emphasised that the content of that part of the roof report covering the analysis in accordance with Art 5 of the WFD is based on data arising from methodologies that were not harmonised within the IMC. Their comparability is therefore limited. Nevertheless, coordination in the collection of data was, as far as possible, ensured within the IMC

1.3 Bilateral Coordination

The single river basin management plan is mainly to address issues that were identified by all Parties as needing to be co-ordinated at the multilateral level of the Meuse Commission. Not all issues need such co-ordination; some of them may be entrusted to bilateral trans-boundary water commissions or working groups.

2 General Description of the International River Basin District Meuse

2.1 The International River Basin District Meuse

The IRBD Meuse is composed of the Meuse river basin and its associated groundwaters and coastal waters. It covers, from upstream to downstream, parts of the territories of France, Luxemburg, Belgium (Wallonia, Flanders), Germany and The Netherlands (Annex 3)

The IRBD Meuse was defined by a decision taken by France, Luxemburg, Belgium, the Walloon Region, the Flemish Region, the Brussels-Capital Region, Germany and the Netherlands (hereinafter the "Parties") at a Ministerial conference held in Liège on 30 November 30, 2001. This decision was subsequently included in the International Meuse Agreement signed by the Ministers in Ghent on 3 December 2002). The Parties agreed to coordinate jointly the implementation of Directive 2000/60/EC in the IRBD Meuse within the framework of the International Meuse Commission.

2.2 Characteristics

2.2.1 General characteristics (Annex 4)

The IRBD Meuse covers a total land area of 34.548 km², with close to nine million inhabitants.

Table 1 below [1]shows the surface area and number of inhabitants for each State or Region.

IRBD Meuse		
	Area (km²)	**Number of Inhabitants (x 1000)**
France	8.919	671
Luxemburg	65	43
Walloon Region	12.300	2.189
Flemish Region	1.596	411
Netherlands	7.700	3.500
Germany	3.968	1.994
TOTAL	**34.548**	**8.808**

The source of the main river, the Meuse, is situated at an altitude of 384m in Pouilly-en-Bassigny in France. Its length, from its source to its mouth in the North Sea, is 905 km.

The most important sub-basins in the IRBD Meuse are those of the following tributaries: the Chiers, the Semois, the Lesse, the Sambre, the Ourthe, the Rur, the Schwalm, the Niers, the Dommel and the Mark. Several of these sub-basins are trans-boundary.

[1] See Chapter 6.3.2 for further information

The water in the IRBD Meuse has many functions, of which the most important are:

- Supply of drinking water
- Domestic uses
- Agriculture
- Industrial use (incl. hydro-electric)
- Navigation (transportation of goods, and leisure)
- Recreation
- Living ecosystem
- Element of the landscape

The 8,8 million inhabitants of the IRBD Meuse consume drinking water produced from ground- and surface water in the district. Moreover, substantial quantities of water are exported by pipes or canals to provide drinking water to about 6 million people living outside the IRBD Meuse.

2.2.2 Climate and Hydrology

The climate in the area of the IRBD Meuse is mainly determined by its geographical location; it is of the temperate oceanic type. At times, the continental component dominates, with high pressure resulting in hot dry summers and cold dry winters. However, for most of the time the oceanic regime dominates, which results in depressions and humid and fresh weather in all seasons.

Overall, the sequence of the seasons depends on the very irregular succession of cyclones and anticyclones. This explains the unpredictability of the seasons and weather patterns that vary from one year to another. The average yearly rainfall is 700 to 1400 mm, with the highest levels in the high Ardennes.

The Meuse is typical of a river fed by rainfall. As its flow depends on precipitation, considerable fluctuations may occur between the seasons and the years. Part of the IRBD Meuse comprises hilly areas with an impermeable sub-soil .There, precipitation in tributary basins may flow rapidly into the Meuse and result in sudden flash floods. The limited rainwater retention in the soil in the middle section of the basin leads to low flow during drier periods. High river flows generally occur in winter and spring. Variations in flow may be abrupt, resulting in floods that last from a few days to several weeks. This was the case, for example, in 1993 when a maximum flow of 3100 m^3/s was measured in Eijsden (border station between Wallonia and the Netherlands). Summer and autumn are mainly characterised by longer periods of low flows, for example 10 to 40 m^3/s in Eijsden.

Interventions on the watercourse carried out for the sake of hydrological management and navigation, also induce fluctuations in the flow of the Meuse. A number of locks and dams built for navigation purposes or for protection against floods resulted in significant modifications of the natural character of the river in most of its sections.

2.2.3 Geomorphological Features

Based on geomorphologic and physical features, it is possible to distinguish three areas in the Meuse river basin:

- The first area stretches from the source of the Meuse on the Langres Plateau to immediately downstream of Charleville-Mézières in France.
- The second area starts downstream of Charleville-Mézières and ends immediately after Liège in Belgium. It covers a large part of the Ardennes Plateau and the Walloon part of the IRBD.
- The third area begins at Liège and ends in the deltaic region of the Netherlands, where the Meuse flows into the North Sea at a point just between the mouths of the international Scheldt and Rhine rivers. It covers the German, Flemish and Netherlands parts of the IRBD.

The features of these areas determine the environmental potential of the river.

Area 1 – from the source to Charleville-Mézières

The bedrock is made up of calcareous and porous rock (through which rain flows quickly) while gravel covers the river bottom. The Meuse basin is very narrow, but the flood plain is broad with a slight slope, resulting in a low flow velocity.

The "Canal de l"Est" runs alongside a large part of this section of the Meuse. In those stretches, because of the presence of the canal, the Meuse itself is not navigable. In the last part of this section, however, (from Troussey onwards) the river was canalised, resulting in a lower hydro-morphological quality.

There is little industrialization and urbanisation in this section of the Meuse and the environmental pressure is relatively low. In addition, this part of the basin is sparsely populated. Different types of forest grow alongside the river.

Area 2 – From Charleville-Mézières to Liège

Here the bedrock is composed of rocks with low-porosity. The width of the basin increases and the sub-basins of the Semois, the Lesse, the Sambre and the Ourthe are relatively large. During periods of heavy precipitation, these tributaries substantially contribute to the flow of the Meuse, which may result in rapid rises of the water level.

These tributaries are the main natural assets of this section and are especially important as spawning grounds and growth areas for rheophil fish.

Major works were carried out on the main course of the Meuse to make it navigable in this section, which also features many heavily urbanised areas as well as industrial areas, both along the main course and along the Sambre.

In the upper part of this section, there are a few small islands in the river and parts of the banks have kept their natural characteristics, providing habitats to a variety of plant and animal species.

Area 3 – from Liège to the mouth

A variety of features characterise this section.

Its upstream part is composed of calcareous rock and clay, and the Meuse is deeply embanked. The flood plain is narrow in this area and the tributaries flow in forested areas. North of Maastricht, the soil is mainly sandy, while the bottom of the flood plain consists mostly of gravel.

The remainder of the Meuse in the Netherlands is navigable, which limits the natural character of the low-water channel and severely reduces the fluvial dynamics. This region is characterised by a very dense population, intense agriculture and many industrial installations. There are zones of great ecological value (woods, heathers, marshlands), but their area was reduced and they are now widely dispersed.

The northwestern part runs through an attractive and relatively open area that is surrounded by urban harbour areas. However, progressing urbanisation, increasing transport and industrial and agricultural activities have resulted in intensified interactions between those areas and in significant pressures on the aquatic environment. Safety and flood control measures (Deltaworks, closure of the Haringvliet) taken in the 1970s were essential from a social point of view but deprived the area of the tidal dynamics and have led to a loss of ecological potential. Recently, the Dutch government decided to establish a different management regime for the floodgates of the Haringvliet by 2008, in order to reintroduce tidal influence.

3 Surface Waters

3.1 Coordinated approach for the typology of the rivers of the Meuse International River Basin District

3.1.1 Introduction

Surface water bodies within a river basin district are to be identified as rivers, lakes, transitional waters or coastal waters. For each category, all water bodies must be differentiated according to type using either "system A" or "system B" (Annex II of WFD).

"System A" provides for a first differentiation of water bodies according to the relevant ecoregions described in appendix XI of the WFD. Within each ecoregion, the water bodies are then further differentiated by type according to a set of criteria or descriptors (altitude, size, geology, average depth).

"System B" is more flexible in allowing the Member States to differentiate types using optional (mainly physical and chemical) descriptors, or combinations of descriptors in addition to a set of mandatory descriptors. However, if "System B", is used, Member Sates must achieve at least the same degree of differentiation as would be achieved using "System A". The criteria and descriptors used for differentiating the water body types must ensure that type specific biological reference conditions can be reliably derived. (WFD Annex II 1.1 - iv).

All the States and Regions in the IRBD Meuse decided to use system B for both rivers and lakes. Since the system A obligatory descriptors are included, States are able to introduce more detail into the typology by using either more specific criteria or additional descriptors.

A coordinated approach for the typology is only achievable for rivers. For lakes, the approaches are too diverse to allow a similar coordination over the whole of the IRBD Meuse. The following section on typology therefore excludes lakes. However, they are covered in the analysis of the subsequent description of water bodies and pressures.

The coordinated approach for the river typology establish a distinction between the main course of the Meuse and its tributaries. The national typologies were compared and integrated in a concordance table. The Meuse was extracted from this, and divided into homogeneous stretches based on natural criteria.

3.1.2 Coordinated Approach to the Typology of the Rivers

The first step towards the coordination of the typologies of the rivers in the IRBD was a compilation of the typologies applied by the various States and Regions. No waters of the “transitional” type were identified in the IRBD. Waters in the Netherlands that could have been identified as such were classified instead as rivers and/or lakes. These are waters that were dammed on the seaward side (the Delta Plan), which excludes any tidal influence. For economic and safety reasons this situation is unlikely to change in the near future.

As a second step, the criteria and descriptors used in the typologies of the States and Regions were compared. In order to coordinate the typologies of the rivers within the IRBD (Annex 5), a selection of criteria and descriptors was made by deleting those that were not relevant or not applicable at the scale of the district. Finally, the types distinguished by the States and Regions were combined into 14 types based on two descriptors, i.e. hydro-ecoregion and size of the tributary basin.

The seven differentiated hydro-ecoregions in the IRBD Meuse are:

- Calcareous regions; tertiary calcareous formations of Trias and Jura in Lorraine and the Eiffel;
- Famenne; Devonian slate plateau formation adjacent to the Ardennes mountainous region, with fast flowing calcareous watercourses.
- Siliceous mountainous bedrock formations of the Ardennes and the Eiffel.
- Hilly regions of Condroz, lower areas of chalky massifs and river moraines and river terraces with mixed river substrates and intermediate character of velocity, alkalinity and sediment of watercourses.
- Eolic loam region; quaternary loamy plateaus with incised watercourses with fine sediments and higher alkalinity.
- Sandy areas, myocene sandy regions and quaternary lowland regions, where the streams have a sandy bed. Campine region with lowland streams with sandy beds
- Organic peat and clay valleys and moorlands, drained by small watercourses with heavy loads of organic matters and sediments.

The size of the hydrographic basins was used as a criterion in addition to the obligatory factors of "system B ". Different criteria having been applied by the States and Regions only the final classification is shown in Annex 5.

The typologies of the various States and Regions will obviously be more differentiated and describe more accurately the water types. A more detailed characterisation of the national types can be found in the reports of the States and Regions.

Annex 5 shows the distribution of the types in the hydrographic network for the main rivers in the district shown on the basic hydrographic map (Annex 3). This map only depicts the rivers whose sub-basins have a minimum area of approx. 300 km². Some types are not shown on the map, because the corresponding sub-basins are smaller than 300 km².

The typology of the water bodies on Dutch territory that were identified as heavily modified (3.4) was based on a wish to reflect the best achievable status of these water bodies (maximum potential). This differs from the typology used by the other Parties, which reflects the original natural characteristics of the water body.

3.1.3 Coordinated Approach to the Typology of the Main River

To allow for a specific description of the Meuse, a distinct typology was developed for its main course, based on a division into geomorphologic sectors (Annexes 6 and 7). The typology does not follow the hydro-ecoregions: in comparison to the surrounding areas, the main river shows different characteristics as regards substrate and run off in its alluvial plain. The Meuse river was therefore classified as a distinct type in the Belgian and Dutch typologies, while in the coordinated approach a typology by segments was developed. Segments were identified based on physical and geomorphologic features of the river and its valley: broad meandering alluvial segments or narrow incised segments, gravelly or sandy beds, tidal influence. A common transboundary type is used by Wallonia, Flanders and the Netherlands.

The typology of the main course of the Meuse river shown at Annex 6 rests, for the various States and Regions, to the identification and the allocation of the 10 types that apply to the river. It constitutes a new and broadly accepted descriptive basis for the hydrologic system of that river. In future, such a division into sections could be used more widely as a basis for typology in the international context.

3.2 Water Bodies in the International River Basin District Meuse

Based on the typology of surface waters, each State delimitated and characterised water bodies that are the basic entities for setting objectives and for the reporting. A water body is a unit with sufficiently homogeneous characteristics, level of quality and objectives. The criteria for identifying water bodies are therefore based on the analysis of the characteristics, the analysis of pressures and the register of protected areas. The table showing the coordinated typology (Annex 5) lists the number of water bodies of each type in the various States and Regions.

The table below shows the number of water bodies within the different categories in the various States and Regions:

	Rivers	Lakes	Coastal waters	TOTAL
France	149	5	0	**154**
Luxemburg	1	0	0	**1**
Wallonia	243	12	0	**255**
Flanders	59	5	0	**64**
Netherlands	188	127	2	**317**
Germany	198	1	0	**199**
IRBD Meuse	**838**	**150**	**2**	**990**

France identified 149 water bodies in the IRBD, of which 139 are in the French Meuse basin and 10 in the Sambre basin.

Luxembourg defined only one “river” water body.

Wallonia has 243 “river” water bodies evenly distributed over its eight sub-basins in the IRBD, and 12 lakes.

Flanders has 59 “river” water bodies in the Meuse district, of which 9 are in the western part of the region and the other 50 in the eastern part. Furthermore, there are five artificial water bodies classified in the category lakes.

In its four sub-basins (including the North Sea), the Netherlands identified 317 water bodies, of which several are “virtual” water bodies. Virtual water bodies are clusters of “small waters” of ecological interest. Small waters are ponds, ditches, wells and upstream parts of brooks. Though other countries did not account for such small waters, the Netherlands did so because of the considerable ecological value of a large number of them.

Germany identified 199 water bodies of which 198 are in the “rivers” category. For the purposes of this IRBD report, these bodies were attributed to the Niers and the other northern tributaries of the Meuse (60), to the Schwalm (14) and to the Rur and other southern tributaries (125).

The main course of the Meuse consists of only 21 water bodies. Joint objectives and a joint programme of measures are intended to be developed for the water body shared between Wallonia and the Netherlands. Similarly, it was intended that the water bodies on both sides of the border between Flanders and the Netherlands will be combined into one body, or at least that the international water management reporting should be well coordinated.

3.3 Assessment of the Anthropogenic Pressures on Surface Water Bodies

The data collection was organised into 22 "working units", based on national or regional sub-basins including, where appropriate, some smaller transboundary parts of sub-basins. These sub-basins, or working units, were defined by using hydrological or geographical criteria, which the authorities have sometimes simplified for the sake of administrative manageability. Since the WFD uses the term "sub-basin" in the hydrological sense, this report uses the term "working units".

3.3.1 Driving Forces

Human impact may result in alterations of the natural hydro-morphological conditions in a river segment.

The main driving forces for these alterations are:

- urbanisation
- industrialisation
- agriculture
- navigation

Extensive urbanisation, industrialisation and agriculture lead, for example, to loss of floodplain area, changes in the runoff and discharge regime and altered sediment loads.

In some areas, subsidence of the soil surface due to disused mines made the construction of pumping facilities for urban wastewater and runoff water necessary.

A number of locks and dams were built on the river Meuse and some of its tributaries for navigation purposes or to protect against floods. These works have caused significant modifications of the natural character of the river in most of its sections.

Fluctuations of the flow of the Meuse River and of some of its tributaries are induced by interventions carried out on the watercourse for hydrological management, navigation and, in some places, for hydro-electricity production.

It is worth noting, for example, that on the one hand, the production of hydropower can constitute an environmentally friendly source of energy and that navigation can be an environmentally friendly mode of transport. On the other hand, the benefits of these water uses have to be offset against their adverse effects on the water environment, which in any case have to be reduced as far as technically and economically feasible. Such a cost/benefit assessment is supported by the economic analysis required by the WFD (see chapter 6)

The river Meuse (together with the Sambre) was the main artery of mainland Europe's first industrial revolution. Industrial plants and large towns border the river and its use as a major waterway goes back to before Roman times. This situation has substantially altered the natural hydrological system.

Navigation puts constraints on the shape of the main channel, both vertically (normalisation of the water levels, weirs) and longitudinally (canalisation). It is often combined with a loss of the natural aspects of the riverbanks, altered hydrological regime and water abstraction for canals. Some weirs constitute obstacles to the movement of fish.

Flood protection generally results in a reduction of the floodplain area (e.g., where dikes are constructed) and in a deepening of the main channel. Dams (for water level regulation) and hydroelectric power plants (constructed on these dams) may generate artificial fluctuations of the river flow.

Water abstraction or derivation for supplying drinking water, for industrial purposes and for navigation represent a significant pressure, affecting the hydrological regime, especially at low levels of flow.

The Meuse and the connected canals are important for navigation and for the adduction of surface water for the provision of drinking water to areas outside the district. An international agreement signed between Flanders and the Netherlands regulates the apportioning of water in periods of low river flow between the Meuse at the common border (Grensmaas), the Albert Canal and the Zuid-Willemsvaart.

3.3.2 Hydro-morphological Pressures

The hydro-morphological conditions of the water bodies were analysed in order to determine their level of physical alteration and their potential for ecological restoration. Based on this analysis, water bodies were provisionally classified as “natural” or “heavily modified”. Hydro-morphological conditions refer to the shape of the riverbed and banks, longitudinal continuity, type of substrate of beds and banks, flow and flood conditions, etc. The effects of pressures from water abstraction are also covered in this section. Some water bodies in the IRBD Meuse are classified as artificial because they are man-made.

The driving forces mentioned in 3.3.1 result in different hydro-morphological pressures in the catchment area of the Meuse. As hydro-morphological conditions significantly affect ecological conditions, these pressures considerably altered the ecological status of most of the water bodies. Structural intervention on the watercourse as well as indirect effects of land and water use in the river basin influenced the hydro-morphological characteristics of the river basin.

A wide range of interventions and effects can be found from the source to the mouth of the river and in the IRBD as a whole. This is why hydro-morphological pressures are analysed according to groups of interventions causing a specific type of hydro-morphological pressure. Damming the river on its seaward side (the Haringvliet lock) constitutes a major obstacle to the movement of fish and dampens natural fluctuations of the water level. The construction of a water mill upstream in a tributary can create local barriers to the movement of fish.

The 22 different types of hydro-morphological pressures initially identified were grouped into six groups, using as the criterion their possible impact on ecological integrity.

A distinction is made between obstacles that disrupt the continuity of the flow (transversal obstacles) and those that disrupt the lateral connection (lateral obstacles); and between interventions affecting the riverbed and those affecting the riverbanks. The latter distinction is made on the ground of a difference in impact on the flow regime (quantity of water) and the sediment load.

1	Transversal obstacles	weirs/sluices
		works closing off the sea
		covered channels/pipelines
		artificial water levelling
2	Altered riverbed	canalisation
		normalisation
		deepening of the bed
		groins
		intensive management (clearing/curing) of banks and bed
3	Lateral obstacles	disconnected or reduced floodplain
		dikes
		disconnection of cut off meanders
4	Artificial banks	works aimed at protection of banks
		deforestation of banks / interruption to the regeneration of riverside woodland
5	Changed flow regime	artificial flow regime by diversion (canals)
		artificial flow regime by pumping
		export of water outside the district
		water collection/abstraction
		extraction of groundwater
		intensive drainage/accelerating runoff
6	Perturbations of sediment load	sand and gravel extraction
		sand supplementation (dumping)

Interventions within each group may cause very different ecological impacts. Therefore, in addition to the classification system, a scoring system was used to reflect the intensity of the impact on the water body. The three following scores were used for each of the six groups of pressures:

- Non significant pressures (no significant effect on the ecological status of the water body)
- Reversible significant pressures (a significant effect on the ecological status of the water body, which can be mitigated or removed)
- Irreversible significant pressures (a significant effect on the ecological status of the water body, which cannot be mitigated or removed)

In theory, a pressure is deemed to be reversible if, when removed, the system can potentially return to its natural state of equilibrium and ecological integrity, i.e. to good ecological status. Because this definition is difficult to handle, a more pragmatic approach is being used. Alterations are deemed to be irreversible if they are caused by general changes in land use in the catchment area or by intrinsic functions like navigation or urbanisation, which are not expected to cease by 2015.

The category of “irreversible significant pressures” can lead to a provisional classification of the water body as “heavily modified”, except for the category “changed flow regime”. The two other scores lead to the classification of the water body as “natural”. These classifications will become definitive (3.4) after more elaborate (economic) analysis.

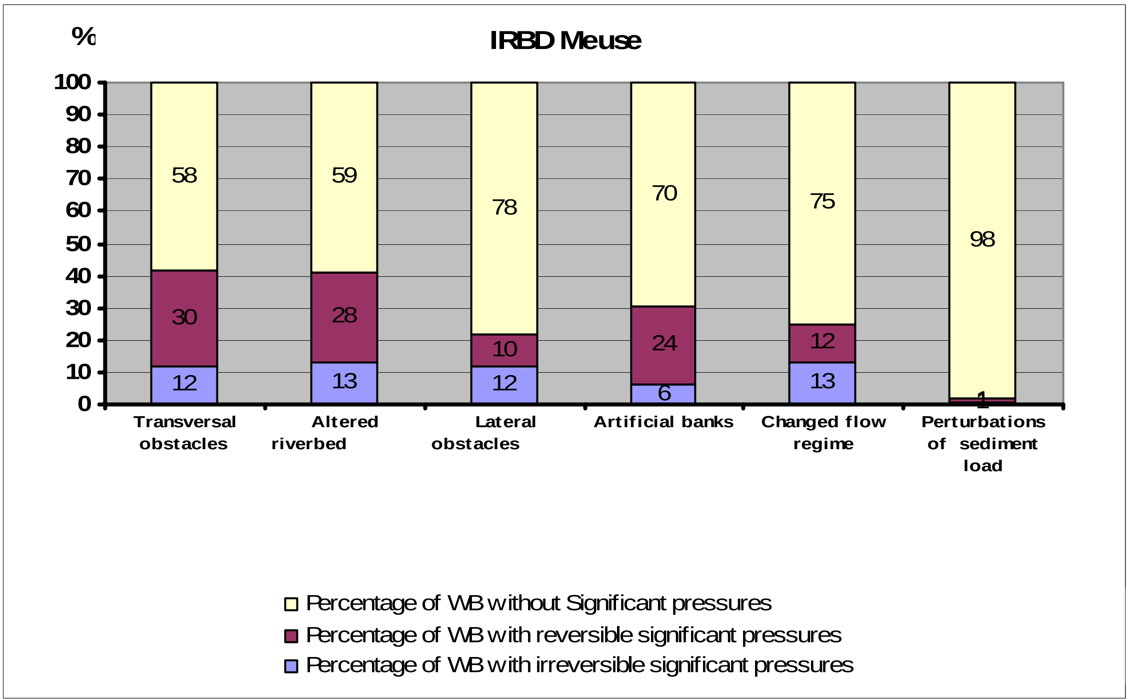
Main Course of the River Meuse

For information about the impacts on the biotic communities of the IRBD, and in particular on those of the main river course, the reader should refer to the “Proceedings of the First International Scientific Symposium on the Meuse” (Maastricht, 27-28 November, 2002). Based on the results of internationally coordinated biological monitoring of the Meuse, man-made banks and the lack of natural substrates (together with poor water quality) were identified as major threats to benthic macro-invertebrate communities in the river Meuse. Hydraulic conditions and characteristics of the riverbed are the principal causes for the absence of natural rheophile fish communities in the river. A number of weirs and turbines of hydroelectric plants represent a considerable obstacle for the movement of organisms, especially for the circulation of fish. In 2002, the IMC published a document listing all the obstacles to the upstream and downstream movement of fish in the Meuse (Annex 8). This document shows that a significant number of obstacles would need to be adapted before free fish circulation is restored. Some hydroelectric plants (i.e. hydro peaking) have a significant local influence on the aquatic and terrestrial communities of fish and invertebrates.

3.3.3 Synopsis of the Hydro-morphological Pressures

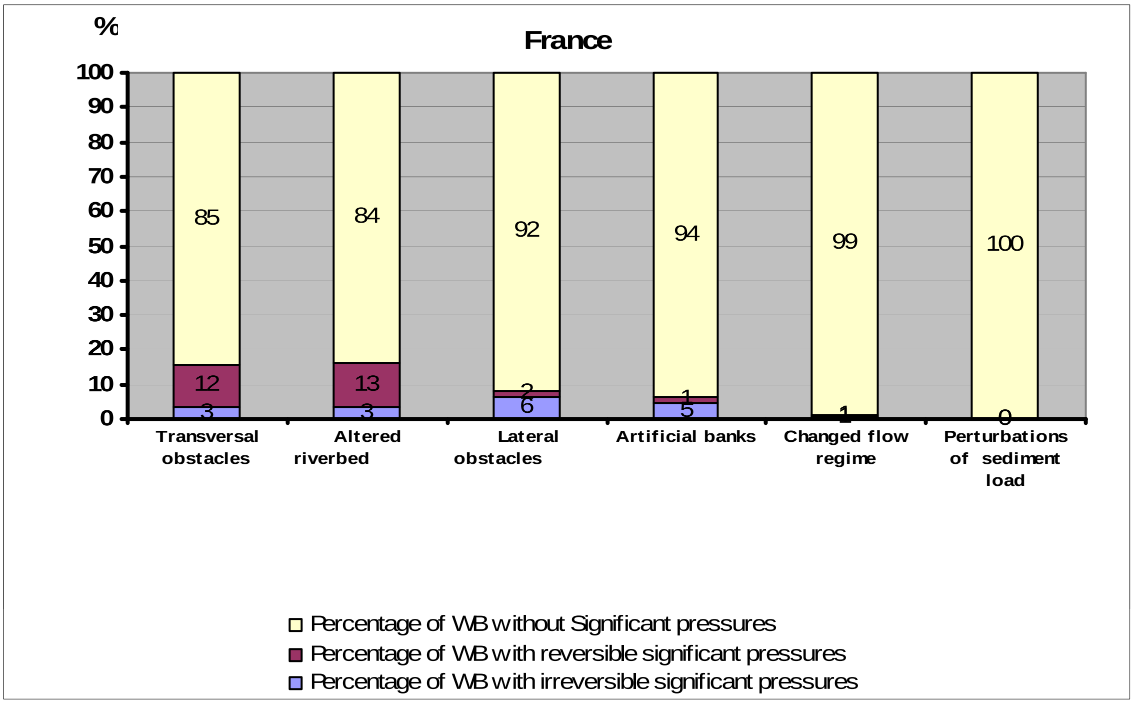
The inventory and the scores were compiled for each working unit (Annex 9).

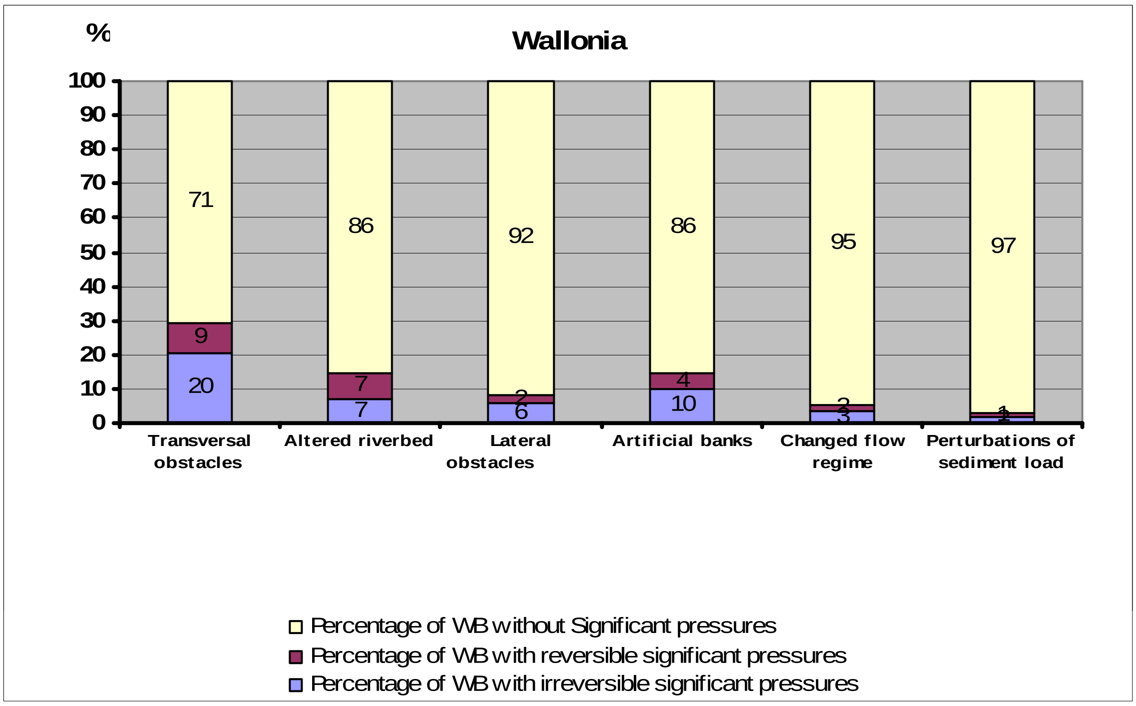
At the scale of the IRBD Meuse, all groups of pressures with the exception of the "perturbations of sediment load" are equally present and significant. However, it should be pointed out that "transversal obstacles" and "changed riverbed" are the most frequently encountered types of hydro-morphological pressures. The bar chart below shows the percentages of water bodies exposed to the various significant pressures.



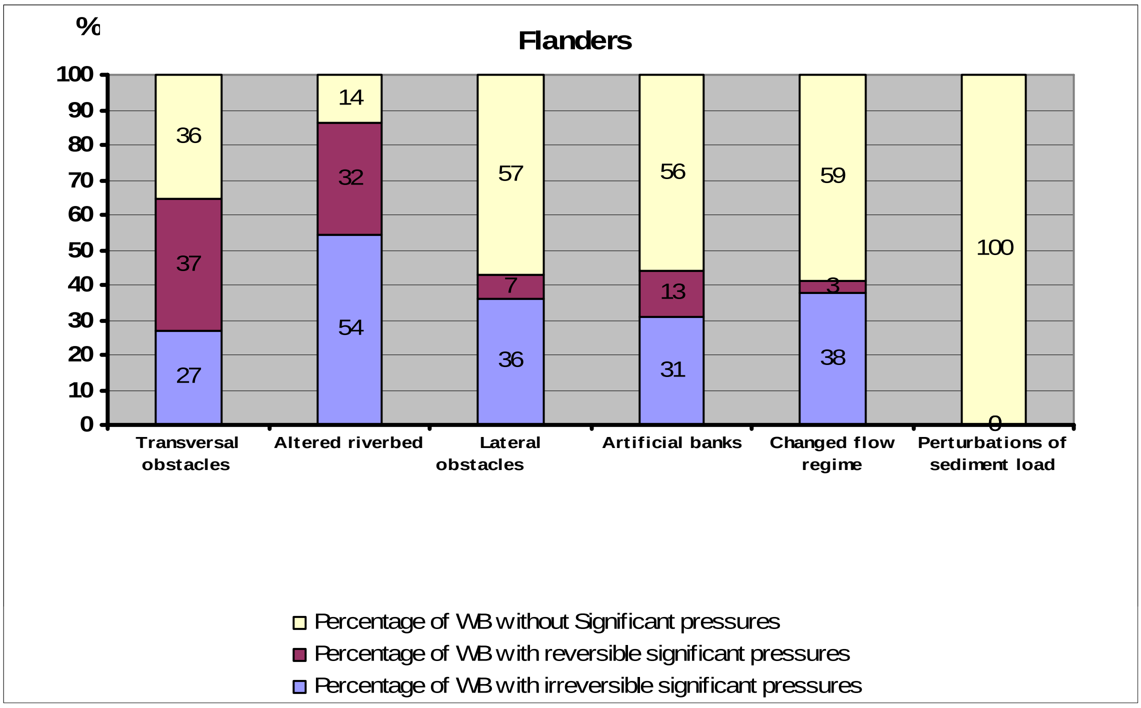
Among the significant hydro-morphologic pressures responsible for the provisional designation of a water body as “heavily modified”, the most important are “changed flow regimes”, “lateral obstacles”, “transversal obstacles” and “altered riverbed”. These pressures generally result in local effects, but can also have an impact upstream and downstream.

The scores compiled for each working unit are at Annex 10. The bar charts below show the percentages of water bodies exposed to the various significant pressures for the various States/Regions.

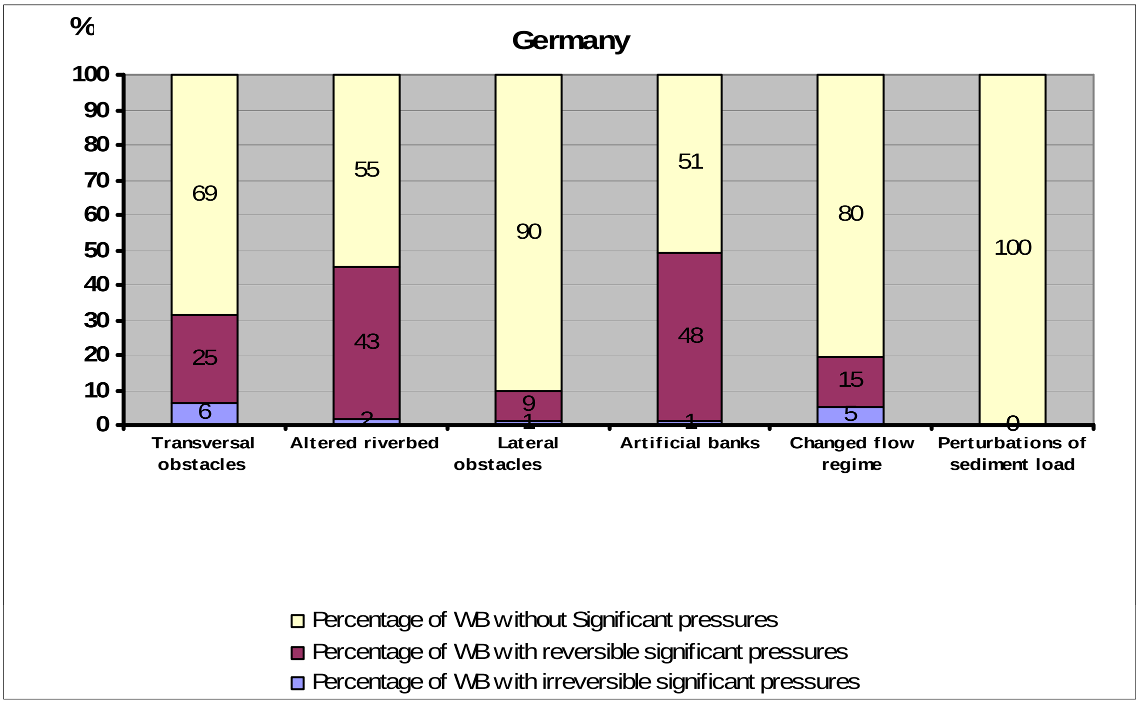




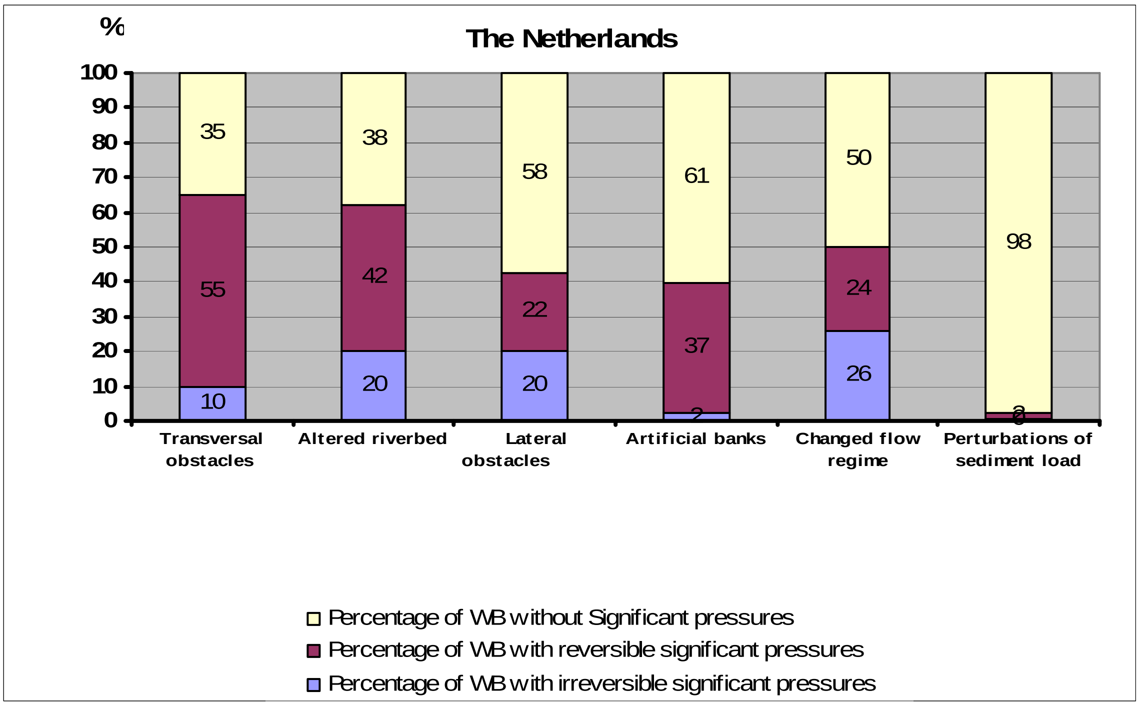
In the French and the Walloon part of the IRBD Meuse, hydro-morphological pressures have altered only a small number of water bodies; the main pressures are riverbed alterations and weirs.



In the Flemish part, transversal obstacles, altered riverbed conditions and man-made banks are responsible for a significant impact on the hydro-morphological conditions of more than 50% of the water bodies.



In the German part of the River Basin, man-made banks, altered riverbed conditions and transversal obstacles are the most significant pressures. There is also a rather high percentage of changed flow regime linked to the influence of the dam-system in the Rur valley.



In the Netherlands, “transversal obstacles” and “altered riverbed conditions” are the most significant pressures in the upstream parts. Downstream, “lateral obstacles” and “changed flow regimes” are the most prevalent pressures, which is characteristic for polders and lowland regions. The Delta Works affect the North Sea and the lower River Meuse by the changes they induce in tidal currents and sediment distribution.

The observed hydro-morphological pressures can be linked to driving forces that are specific to the different parts of the IRBD Meuse. In the French part, agriculture is the main driving force. In Wallonia, in the more densely populated and industrialised working units of the Vesdre and the Sambre, urbanisation is the main driving force. In the working units of the Semois and the Lesse, only small transversal obstacles are present.

In the German, Flemish and Dutch lowlands, urbanisation and agriculture are the major cause behind alterations in hydro-morphological characteristics. In the Netherlands´ part of the river Meuse, most of the pressures arise from flood defence and navigation, although for the smaller watercourses, agriculture remains a major driving force causing such alterations.

In addition to the impacts from transversal obstacles and changes in flow regime, which are considered to be the most significant for the whole of the river basin district, local pressures affecting habitat quality can seriously affect the ecological integrity of the river water bodies.

3.3.4 Point and Diffuse Sources

3.3.4.1 Identification of substances relevant to the IRBD Meuse

The determination of the chemical status of surface waters differs from that of their ecological status. For the chemical status, the criterion used is the occurrence of certain substances in the surface waters. The priority substances listed at Annex X of the WFD will contribute to the determination of the chemical status, provided a daughter directive is adopted. General parameters such as total N, total P and chemical oxygen demand (COD) were used for the biological assessment. The WFD uses the concept of "specific pollutants" to determine ecological status,. These specific pollutants play a crucial role in the determination of the ecological status, because the assessment is based on the “one out; all out” principle (disqualification as soon as one parameter exceeds the quality objective)

The WFD also requires the identification of any pollution by non-priority substances discharged in significant quantities.

The Parties to the International Meuse Commission have limited experience with coordinating monitoring activities and emission inventories. They therefore adopted a generic approach to identifying substances as potential specific pollutants, consisting in the following steps:

- Compilation of a list of candidate substances (280 substances from the lists of relevant substances used in the EU, OSPAR, ICPR, IMC);
- Determination of threshold values based on the most stringent water quality standard used by one of the Parties;
- Comparison of this threshold value with monitoring data available for the main stream of the Meuse (90th percentile or twice the average concentration) - this resulted in the selection of 70 candidate substances.
- Selection of candidate specific pollutants by using the following two criteria:
    - The substance exceeds the threshold in at least two States or Regions.
    - The candidate substances have an anthropogenic source within the Meuse catchment area.
- As a final step, Parties were invited to add candidate substances to the list based on their expertise.

This exercise was carried out on all substances from the first selection. Thereafter, the priority substances were added to the list whether or not they met the criteria; this was done because all priority pollutants have to be included in the monitoring programmes and the programmes of measures to be established. The parameter Chemical Oxygen Demand (COD) was added later to the list, in view of the fact that the “organic” load is a relevant pressure because of its influence on the oxygenation of surface waters. It was also decided to introduce fluoride as a candidate to the list of relevant substances, and to carry out in the near future specific research as to its status in comparison to the other relevant substances. The table below shows the final result of the selection process. The list of Meuse relevant substances will be updated as necessary.

First list of relevant substances for the IRBD Meuse

Number in Annex X	CAS number	EU number	Name of the substance
(6)	7440-43-9	231-152-8	Cadmium and its compounds
(20)	7439-92-1	231-100-4	Lead and its compounds
(21)	7439-97-6	231-106-7	Mercury and its compounds
(23)	7440-02-0	231-111-4	Nickel and its compounds
(3)	1912-24-9	217-617-8	Atrazine
(13)	330-54-1	206-354-4	Diuron
(29)	122-34-9	204-535-2	Simazine
(2)	120-12-7	204-371-1	Anthracene
(8)	470-90-6	207-432-0	Chlorfenvinphos
(10)	107-06-2	203-458-1	1,2-Dichloroethane
(12)	117-81-7	204-211-0	Di(2-ethylhexyl)phthalate (DEHP)
(14)	115-29-7	204-079-4	Endosulfan
	959-98-8	n.a.	(alpha-endosulfan)

(16)	118-74-1	204-273-9	Hexachlorobenzene
(17)	87-68-3	201-765-5	Hexachlorobutadiene
(18)	608-73-1	210-158-9	Hexachlorocyclohexane
	58-89-9	200-401-2	(gamma-isomer, Lindane)
(19)	34123-59-6	251-835-4	Isoproturon
(24)	25154-52-3	246-672-0	Nonylphenols
	104-40-5	203-199-4	(4-(para)-nonylphenol)
(26)	608-93-5	210-172-5	Pentachlorobenzene
(28)	n.a.	n.a.	Polycyclic aromatic hydrocarbons
	50-32-8	200-028-5	(Benzo(a)pyrene),
	205-99-2	205-911-9	(Benzo(b)fluoroanthene),
	191-24-2	205-883-8	(Benzo(g,h,i)perylene),
	207-08-9	205-916-6	(Benzo(k)fluoroanthene),
	193-39-5	205-893-2	(Indeno(1,2,3-cd)pyrene)
(15)	206-44-0	205-912-4	(Fluoroanthene),
(30)	688-73-3	211-704-4	Tributyltin compounds
	36643-28-4	n.a.	(Tributyltin-cation)
(33)	1582-09-8	216-428-8	Trifluralin
(32)	67-66-3	200-663-8	Trichloromethane (Chloroform)
(1)	15972-60-8	240-110-8	Alachlor
(4)	71-43-2	200-753-7	Benzene
(5)	n.a.	n.a.	Brominated diphenylethers
(7)	85535-84-8	287-476-5	C10-13-chloroalkanes
(9)	2921-88-2	220-864-4	Chlorpyrifos
(11)	75-09-2	200-838-9	Dichloromethane
(22)	91-20-3	202-049-5	Naphthalene
(25)	1806-26-4	217-302-5	Octylphenols
	140-66-9	n.a.	(para-tert-octylphenol)
(27)	87-86-5	201-778-6	Pentachlorophenol
(31)	12002-48-1	234-413-4	Trichlorobenzene
	120-82-1	204-428-0	(1,2,4-Trichlorobenzene)
	7782-41-4		
General parameters complementing the biological quality elements for the assessment of the ecological status (WFD Annex V)			N tot
			P tot
			Chemical Oxygen Demand – COD
Specific parameters for the assessment of the ecological status (WFD Annex V)			Copper
			Zinc
			Dichlorvos
			Pyrazone
			PCB (101, 118, 138, 153, 180, 28 and 52)
Candidate substance			Fluoride

3.3.4.2 Detection of sources and emission inventory

The results of a EU wide study on “Source Screening of Priority Substances” and of earlier work on emission inventories in the IMC were used to identify 10 relevant sources and pathways. An assessment of the possibility of quantifying the emissions from all possible sources and pathways for the substances on the list led the Parties to conclude that a meaningful quantification of emissions would be possible for:

- The general parameters: N tot, P tot and COD

- The following metals: mercury, cadmium, copper, lead, nickel and zinc
- The following pesticides: atrazine, diuron and simazine.

An emission inventory for the general parameters proved feasible for the entire IRBD Meuse. The data available on heavy metals did not cover the entire IRBD, but were sufficient to enable the identification of the principal pathways.

The data on the other Meuse relevant substances were insufficiently comparable for the IRBD as a whole to yield either quantitative or qualitative information on emissions.

Most of the data and information on these relevant substances are available in most of the national reports. For the sake of presenting the information, several sources and pathways were combined, as shown in the table below.

Collected Sources and Pathways	**Aggregated Sources and pathways IMC**
Direct industrial discharges	Industrial discharge
Treated sewage	sewage treated at a public treatment plant
Untreated sewage (pavement, households, industrial)	sewage not treated at a public treatment plant
households not connected to sewers	
Storm water discharges	
Drainage and ground water	Agriculture
Leaching, erosion, spills, direct drainage discharges + atmospheric depositions on surfaces	
Direct atmospheric deposition	Rest
Transport (navigation + infrastructure)	
Direct runoff from impermeable surfaces (roads, …) not connected to public sewer	
Leaching from historically polluted sites and soils	

As the case was for the hydro-morphological pressures (see chapters 3.3.2 and 3.3.3), the data collection was carried out through 22 working units. As far as possible, data on point and diffuse sources from smaller trans-boundary units were gathered, as far as possible..

Based on the information available, an aggregated inventory of COD and of the following emissions was deemed feasible: nitrogen, phosphorous, cadmium, lead, mercury, nickel, copper and zinc. The current situation for the various (group of) substance(s) is described in more detail in the sections below.

Some caution is needed when interpreting the category “untreated waste water” in the graphs (and maps) below. For this category, comparability between Parties is low due to different allocation practices for untreated discharges from households not connected to a sewerage system and for storm water discharges. In Germany, for example, the category "untreated sewage" comprises the storm water discharges, whereas the proportion of "treated sewage" from households and industry is assessed as being almost 100%.

3.3.4.3 Emissions of nitrogen and phosphorous

Emissions of nutrients (mainly nitrogen and phosphorous) result in an increase of aquatic vegetation (eutrophication). The aquatic ecosystem and the water quality may be adversely affected in periods of eutrophication.

If surface water is used to produce drinking water, other nuisances may occur. Microscopic algae may clog filters or add an undesirable taste and odour (tainting) to the water. Adverse effects may occur in the downstream zone of the river or in reservoirs used for long-term storage of water from the Meuse river. These circumstances may also result in the production of toxic substances (by cyanobacteria).

Nutrients causing eutrophication reach waters by two main processes:

- leaching mainly from agricultural soil (diffuse sources)
- direct discharge from households, stock-breeding or industrial point sources.

The relatively high population and large agricultural and industrial production in the IRBD Meuse can lead to potentially significant nutrient inputs into the river network.

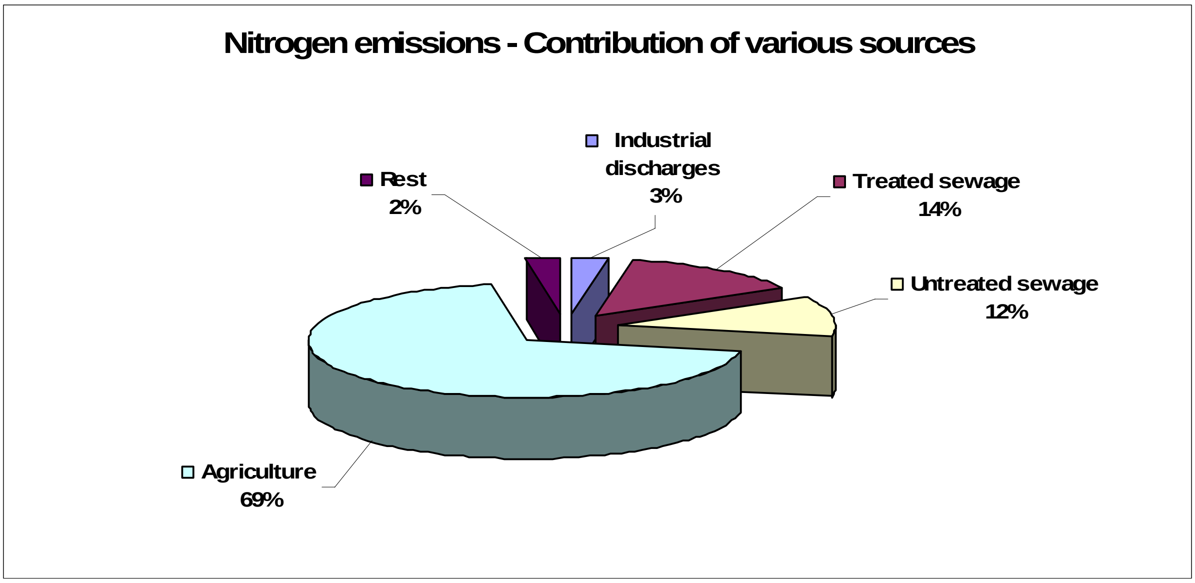
This is illustrated below.

Nitrogen (Annexes 11 and 12)

The graph below shows the contribution of the different sources to total nitrogen emissions (Annex 11) in the IRBD. Agriculture is apparently the main nitrogen source in the IRBD Meuse, with a contribution of almost 70 % of the total emissions.

The map at Annex 12 shows that agriculture is the main contributor to emissions in all working units. The contribution from industrial discharges is negligible, while treated and untreated sewage constitute the bulk of the remaining emissions.

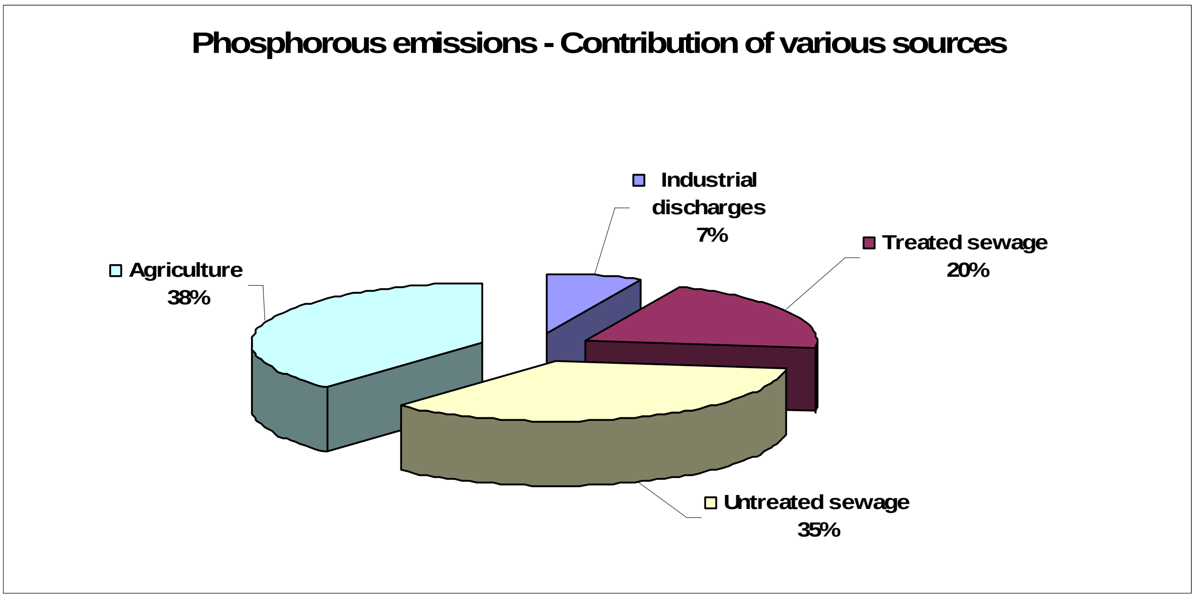
The figures represent yearly loads; the relative contributions can vary significantly during the year.



Phosphorous (Annexes 13 and 14)

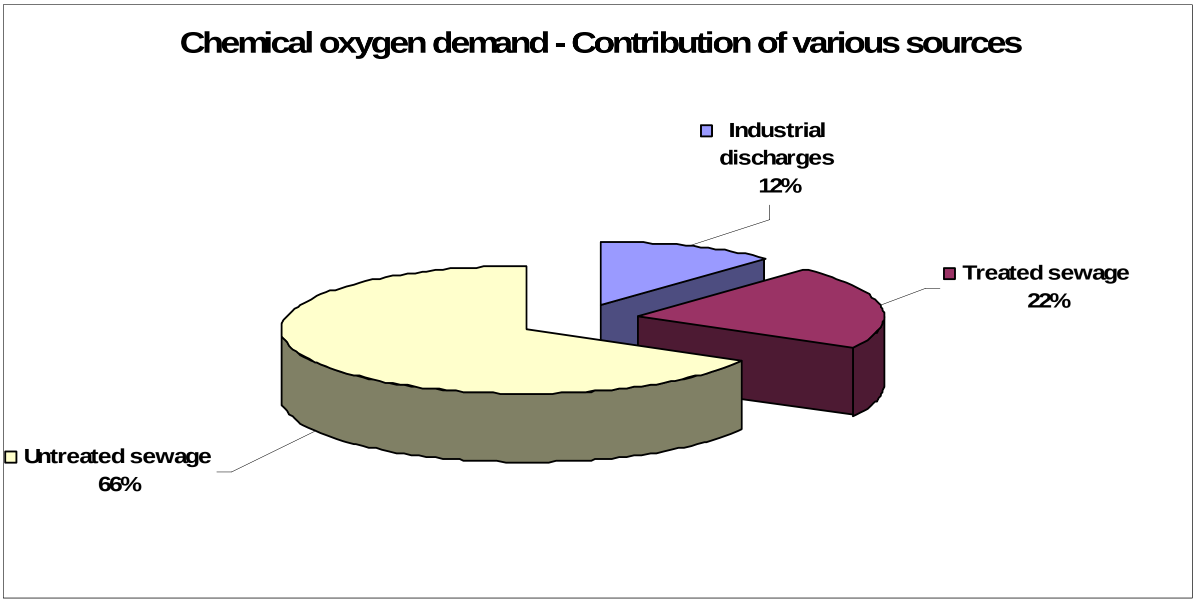
The data for emissions of phosphorous (Annex 13) show that there are three main contributors: agriculture (37%), untreated sewage (35%) and, to a lesser extent, treated sewage (20%).

The map at Annex 14 shows that agriculture is the main contributor in almost all working units and its inputs are distributed evenly within the IRBD. The category “untreated sewage” is also significant.



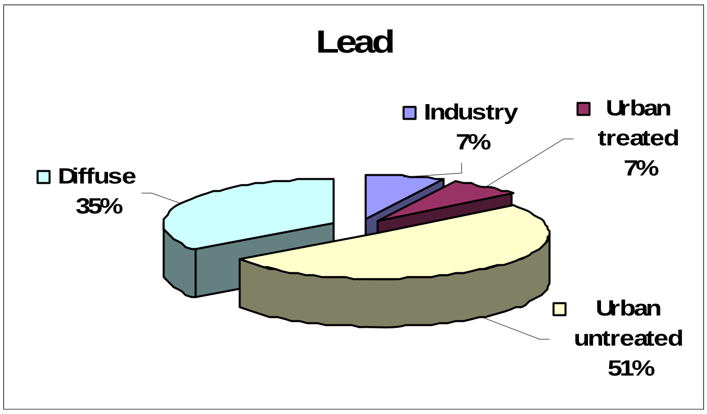
3.3.4.4 Chemical Oxygen Demand (Annexes 15 and 16)

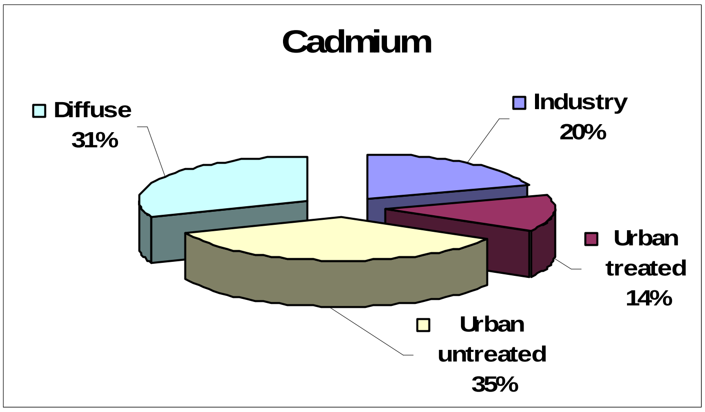
Chemical oxygen demand (COD) was assessed for three sources and pathways: industrial discharges, untreated sewage and treated sewage. The compiled data (Annex 15) show that, as can be expected, almost 65% of the COD in the IRBD Meuse is due to "untreated sewage". The map at Annex 16 shows that untreated sewage is discharged mainly in upstream areas and less in downstream parts of the IRBD Meuse.

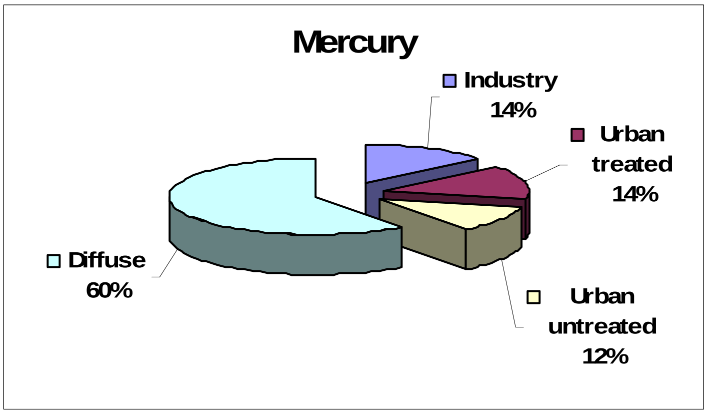


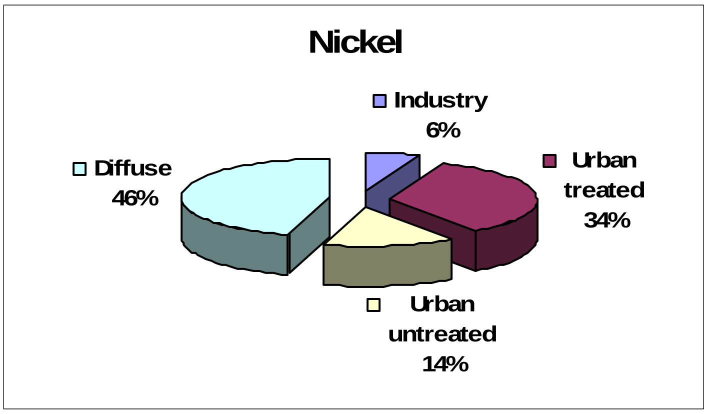
3.3.4.5 Heavy metals

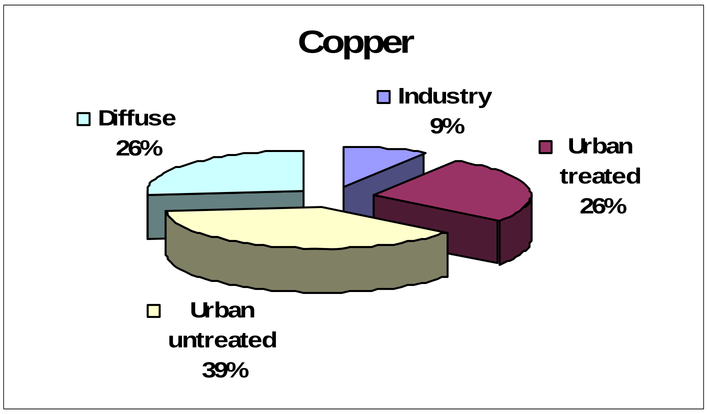
The Parties to the Meuse Commission use a harmonised emission grid that should allow a quantitative inventory of heavy metals emissions to be established. However, the Parties do not dispose of a complete data set. The available data were therefore supplemented with estimates so that the contributions from the relevant pathways can be presented as percentages for the whole hydrographic district. However, it was not possible to quantify these emissions in a meaningful way .

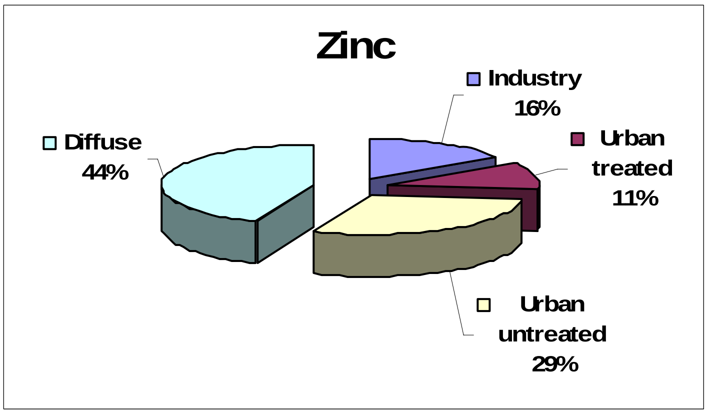












The graphs clearly show that, except for lead and copper, diffuse sources are the main emission pathway for heavy metals. For cadmium, lead and copper untreated urban emissions are particularly significant. Nickel and copper emissions from treated urban wastewater also contribute largely to the total discharge.

Please note that the figures above give no indication of the total load of heavy metals emitted.

3.3.4.6 Other substances on the first list of Meuse relevant substances

It was not possible to produce a meaningful account of emissions into surface waters for the other substances on the list of Meuse relevant substances. Lack of data and differences in methodologies made the description or quantification of emissions impossible. The individual national reports may provide such information for the territories of the Parties.

3.4 Identification of Artificial or Candidate Heavily Modified Water Bodies

(Annexes 17, 18 and 19)

The ecological objectives that have to be met by 2015 are directly related to the status of water body (i.e. “natural”, “artificial” or “heavily modified”).

A natural water body has to achieve good ecological status. For artificial and heavily modified waters, the target was adapted to that of “good ecological potential”. This chapter presents a synthesis of the status of the various water bodies in the countries of the IRBD.

A water body is designated as “heavily modified”, when its natural status has significantly been altered by hydro-morphological pressures considered, for economic or social reasons, to be irreversible.

The hydro-morphological pressures in the different parts of the IRBD were analysed at sections 3.3.2 and 3.3.3. Based on a first estimate, a water body is provisionally designated as heavily modified when:

- at least one of the hydro-morphological pressures has significant influence on the ecological status of the water body

or

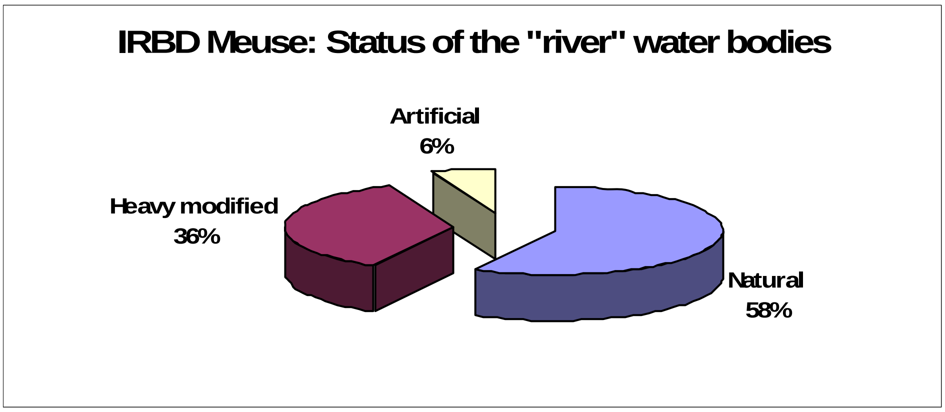
- at least one of the hydro-morphological pressures leads to a change of type

and

- the effects of the hydro-morphological pressures seem to be irreversible up to 2015.

The definitive status of the water bodies will be effected in the period 2004-2009, based on a more elaborate analysis of water body characterisation and on a socio-economic analysis.

The interpretation of the “irreversibility” criterion differs from one country to the other. For most of the Dutch-German trans-national rivers, the designation of the status was coordinated.



Over the entire IRBD, almost 58% of the surface water bodies fall in the “natural” status. The rest of the water bodies is either “heavily modified” (36%) or “artificial” (6%). Annex 18 shows the distribution of the water body status in the IRBD. Annex 19 shows the status in each of the working units and for each State/Region.

In France only 11% of the water bodies are “artificial” (5%) or provisionally designated as “heavily modified” (6%).

In Luxemburg, only one water body was provisionally designated as “heavily modified”.

Wallonia has a high (provisional) percentage (78%) of “natural water” bodies, varying from 100% “natural water” bodies in the hydrographic basin of the Lesse to 36% in that of the Vesdre.

A first assessment for Flanders results in a percentage of 31% “natural”, 50% “heavily modified” and 19% “artificial” water bodies.

In Germany, the Schwalm and the Niers, as well as the hydrographic basins of the northern Meuse tributaries have a relatively high percentage of “natural waters”, while the Rur and the other, southern, Meuse tributaries have no more than 61% of “natural water” bodies.

In the Netherlands, almost all water bodies are provisionally designated as “heavily modified” (79%). Only a small number of water bodies are still designated as “natural” (6%). These water bodies are mainly clusters of small and bigger ponds, fast-running brooks and streams and areas of springs. Only 1% of the total of surface waters in the Netherlands´ part of the Meuse river basin is natural.

The Netherlands designated the majority of their artificial waters as “lakes”. In this case, the category covers canals, ditches and ponds that were excavated. However, a number of artificial waters are listed as “rivers”. In this case, it concerns headwaters, such as the Bergsche Maas, which was excavated and now functions in part as the main course of the Meuse river. This particularity of the Dutch approach to characterisation has already been explained at paragraph 3.1.

The map (Annex 19) shows the percentages of “natural”, “heavily modified” and “artificial” water bodies for each of the working units in the IRBD Meuse.

3.5 Summary of the Risk Assessment

The WFD requires an assessment of the likelihood that surface water bodies will meet, by 2015, the environmental objectives set out under Article 4 of the Directive. The aim of this assessment is to identify major problems, as well as priorities to be taken into account when developing monitoring programmes to be implemented by the end of 2006, and when establishing programmes of measures. This risk assessment should not be interpreted as a final classification of water bodies in terms of their ecological and chemical status. The final classification will be carried out later based on data to be provided by the future monitoring programmes.

The national methodologies used to assess the biological quality of the IRBD Meuse are quite various and not always sufficiently comparable to allow for a common assessment of the biological status. This report therefore does not revisit the bulk of information contained in the national reports on the biology, the physico-chemistry and the hydro-morphology. This information is available and can be found in most of the national reports or in the annual reports published by the International Meuse Commission.

The table at Annex 20 provides an aggregated picture of the results of the risk assessment carried out by the States and Regions based on the available data and using their respective assessment schemes.

It should be pointed out that for the German part, the assessment of the likelihood of achieving the environmental objective is based on a *status quo* (2004) whereas for the other Parties trends-scenarios to 2015 were to some extent taken into account.

The assessment schemes of the States and Regions of the district differ slightly in the selection and definition of the quality elements taken into account in the risk assessment. Detailed descriptions of the methodologies can be found in their national reports. The quality elements (biological, hydro-morphological, physico-chemical, specific substances, substances at annexes IX and X of the WFD) used for the presentation of the results of the risk assessment should therefore not be regarded as harmonised criteria but rather as categories indicating the kind of pressure or impact which results in assigning a water body to the “at risk” group. For example, some Parties make mention of the analyses of chemical pollution according to the lists in the annexes of the WFD whereas others do not.

The table nonetheless provides a first indication of water bodies being “at risk” for the entire Meuse basin using a scale similar to that used for the analyses of pressures, and presents the data for the 22 working units. The aggregated information on the risk analysis for natural water bodies per working unit is in Annex 21.

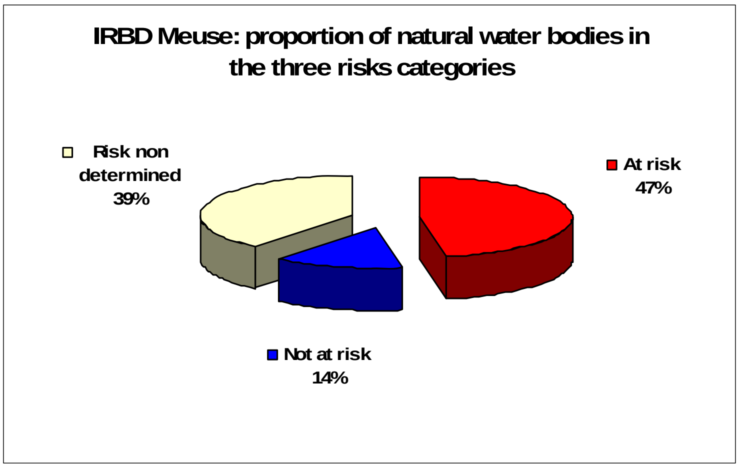
The validity of the information presented in the table and the map is obviously here and there influenced by the lack of data, and by the solutions Parties have chosen to compensate for this lack when fulfilling their obligation to carry out risk analyses. For example, in the absence of biological data, some States use hydro-morphological alterations as an indicator for the risk of failing to meet biological objectives, whereas the Directive mentions the hydro-morphological elements only as a supporting criterion for the biological elements.

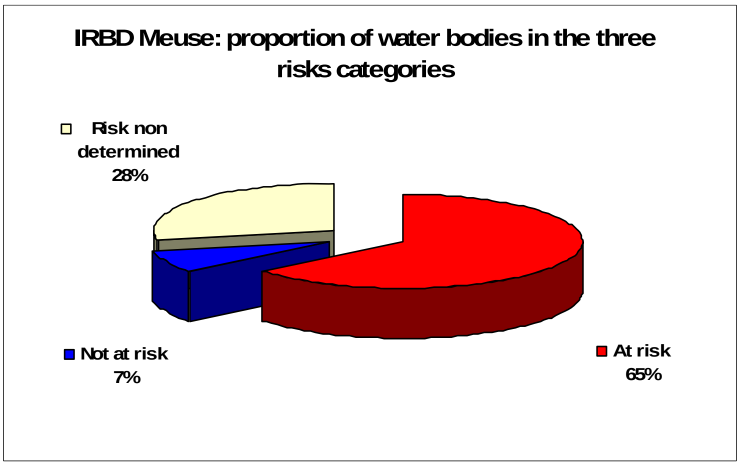
The table provides information on the risk assessment not only for the water bodies considered “natural” but also for the “artificial” water bodies and for those provisionally designated as “heavily modified”. This shows that some States and Regions have also carried out a risk assessment for artificial and potentially heavily modified water bodies, taking into account various quality elements. Others have not done so, because the objective (good ecological potential) against which the risk should be assessed has not yet been defined for “heavily modified” and “artificial” water bodies. Due to the high percentage of “artificial” and potentially “heavily modified” water bodies in the Dutch part of the IRBD, the Netherlands have carried out a more detailed analysis of these water bodies.

In the whole of the hydrographic district, almost 50 % of the natural water bodies are considered to be “at risk”. At the level of the working units, this varies from 0 % to 100 %. It should be noted that, in order to get a complete picture, the approx. 470 water bodies identified as “artificial” or potentially “heavily modified” should also be taken into account.

In some of the working units, a risk assessment of these water bodies was carried out. It emerged that all “artificial” and “heavily modified” water bodies are considered to be “at risk”.

In the working unit “Benedenmaas”, for example, only 1 water body was characterised as “natural” – and assessed as “not at risk”, but 28 water bodies were identified as potentially “heavily modified” and 19 as “artificial”. In that working unit, 47(or 98%) of the total number of water bodies are assessed as being “at risk”. In addition to the hydro-morphological criteria, the physico-chemical and biological criteria, and the data on substances are in many cases relevant for assigning potentially “heavily modified” and “artificial” water bodies to the “at risk” category.





The data assembled per working unit (Annex 20) for the upper half of the main river (up to kilometre 420), indicate that 90% of the water bodies are "natural", and that 46% of these are considered to be "at risk". Downstream, the proportion of water bodies provisionally identified as "heavily modified" is about 50%. For this part of the main river, approx. 70 % of the total number of water bodies, but only about 46% of the natural water bodies, is assessed as being "at risk".

For the working units linked to the sub-basins of the Meuse river, the picture is different. It has not yet been possible to attribute 60% of the water bodies of the working units "Semois-Chiers" , "Lesse", "Ourthe" "Ambleve" and "Vesdre" to a risk category ("at risk" or "not at risk") because of lack of data,

It should be pointed out that at this stage, the WFD does not require a risk analysis for the water bodies provisionally designated as "heavily modified" or "artificial" Nevertheless, in some working units, a risk analysis was carried out on these water bodies and they have been included in the risk assessment. Consequently, for these working units the percentage of water bodies considered to be at risk tends to be higher.

High percentages of water bodies "at risk" occur in the working units "Niers and other northern Meuse tributaries" (100%), "Schwalm" (100%), "Jeker" (100%), "Dommel" (100%), "Mark and Small Aa" (100%) and the lower part of the "Sambre" (47% of natural water bodies).

The water bodies in the working units "Niers" and "Schwalm" are mainly "at risk" because of combined hydro-morphological, biological and physico-chemical (phosphorus and nitrogen) risk factors. Specific substances also play a role. The water bodies in the working units “Dommel”, “Jeker” and “Mark and Small Aa” are at risk due to a combination of different risk factors (hydro-morphological, biological and physico-chemical).

For “Maasland”, “Dommel-Aa” and “Benedenmaas”, the biological and chemical components are the dominant factors. For the majority of these water bodies, specific additional substances also contribute to the risk.

Reference is made to the map of annex 21 showing per working unit the aggregated information regarding the risks of not achieving the objectives for natural waterbodies.

4 Groundwater

A selection of data about groundwater is at Annex 22.

4.1 Delimitation of “Groundwater Bodies”

Annex 23 shows the relevant groundwater bodies [2] for the IRBD Meuse. A “bottom-up” process making use of various methodologies was followed to draw the map, but (hydro) geology was the common criterion used to mark the boundaries of the water bodies. Where necessary, bilateral contacts took place to try to make the limits of the groundwater bodies correspond on both sides of administrative borders.

Generally, the (hydro) geological (lithological) boundaries (in colours on the map) and the national/regional borders do not coincide. However, due to legislative constraints, groundwater bodies are delimited according to national/regional borders. Along the borders, the delimitation of groundwater bodies should be harmonized with a view to future monitoring and water management planning. Some groundwater bodies in the southern part belong to a neighbouring district (blank areas on the Annex 23)[3]. In Flanders five groundwater bodies are trans-district, i.e. they belong to both Meuse and Scheldt river basin districts. These trans-district groundwater bodies were arbitrarily cut off at the district border and are indicated by an additional symbol in their name-code ("m" for Meuse, "s" for Scheldt)

Groundwater bodies extend in three dimensions. The map (Annex 23) shows only the geographical dimension, not the vertical geological dimension. Flanders and the Netherlands both designated groundwater bodies that are superposed (black dots on the map). In the Netherlands 91 groundwater bodies were designated in function of their use in the production of water for human consumption. The majority is very small and not shown on maps and in tables except for one groundwater body (“Centrale Slenk”).

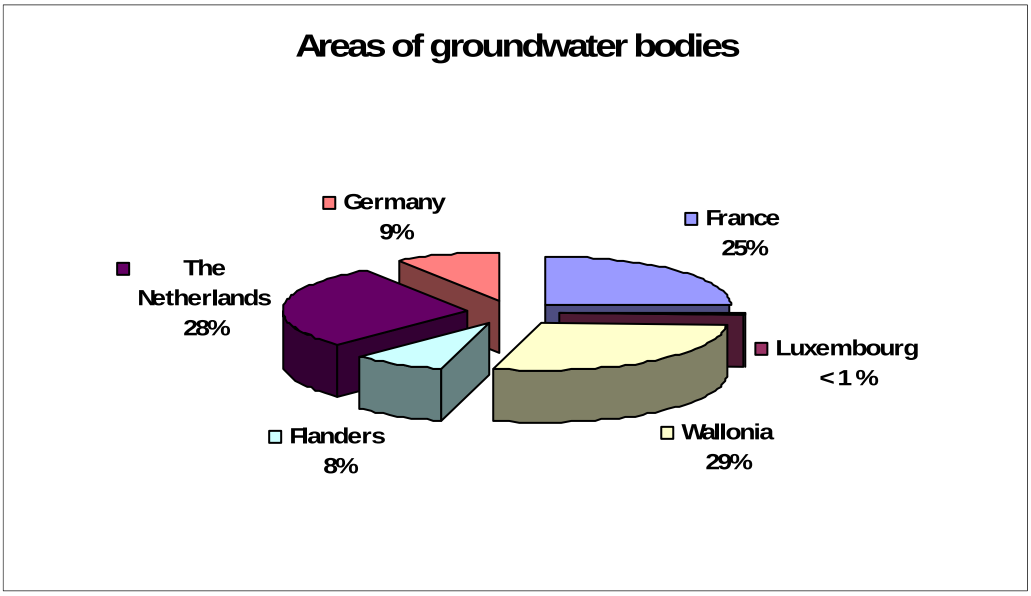
4.2 Assessment of the Influences to which Groundwater Bodies may be exposed

4.2.1 Introduction

(Annex 24)

The table below shows general data on groundwater bodies (GWB) of the IRDB Meuse in terms of the number of such bodies and their area. The total area of groundwater bodies is 43.174 km².

[2] WFD, Article 2, para 12
[3] WFD, Article 3, para 1



The table below[4] shows national areas of groundwater bodies as well as the areas of aquifers that are trans-boundary.

In some States / Regions groundwater bodies are part of aquifers[5] that may be used for the abstraction of groundwater or for artificial recharge, because they have sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater. In some States/Regions, groundwater bodies correspond to the total area of aquifers. Of the total GWB area, 63.5% (27.429 km²) of aquifers are trans-boundary. This is shown on the map at Annex 24 [6] and in the table below[7].

Unit		France	Luxemburg	Wallonia	Flanders	The Netherlands	Germany	TOTAL
General information								
Area of GWB by State/Region (cumulated if overlay)	km²	10 833	169	12 435	3 503	12 247	3 987	43 174
Ratio of GWB area (by state/region) from total GWB area	%	25	0	29	8	28	9	100
Transboarder aquifer	km²	2 889	169	6 209	3 503	10 797	3 862	27 429
	% from GWB area by State / Region	27	100	50	100	88	97	64
Number of GWB	item	12	2	21	10	5	32	82
Mean area of GWB	km²	903	85	592	350	2449	125	527

The two following sections cover the assessment of quantitative and qualitative risks to GWB, based on the assessments done by the respective States and Regions.

[4] There are differences between the areas of groundwater body and the geographical areas presented in Chapter 2 because of the presence of superposed water body layers and/or because of specific reference data for groundwater.
[5] Water Framework Directive art 2, § 11
[6] The map does not show the limits of the aquifers
[7] NL : the five largest ground water bodies which are designated at national level are shown in the table ; 3 of those are transboundary. The discussion between Parties on transboundary groundwater bodies has not yet been finalised . FL : the area of the Flemish part of the IRBD Meuse is smaller than the sum of the surfaces of all the Flemish groundwater bodies, because of the vertical superposition of the groundwater bodies.

It is important to note that the methods used by the States and Regions are specific in several ways. The scope for harmonisation is therefore limited and the results are not directly comparable.

For the German part, the assessment of the likelihood of achieving the environmental objective is based on the evaluation of a *status quo* (2004) whereas for the other Parties trends-scenarios to 2015 were to some extent taken into account.

Moreover, due to the lack of available information, this report could not take account of the impact of the groundwater status on surface ecosystems[8],.If this criterion was taken into account, groundwater bodies provisionally assessed as being "not at risk" may have become "at risk". The map shows the results of the assessment based on the criteria of quantitative balance and trend.

4.2.2 Quantitative Risks

a) Assessment method

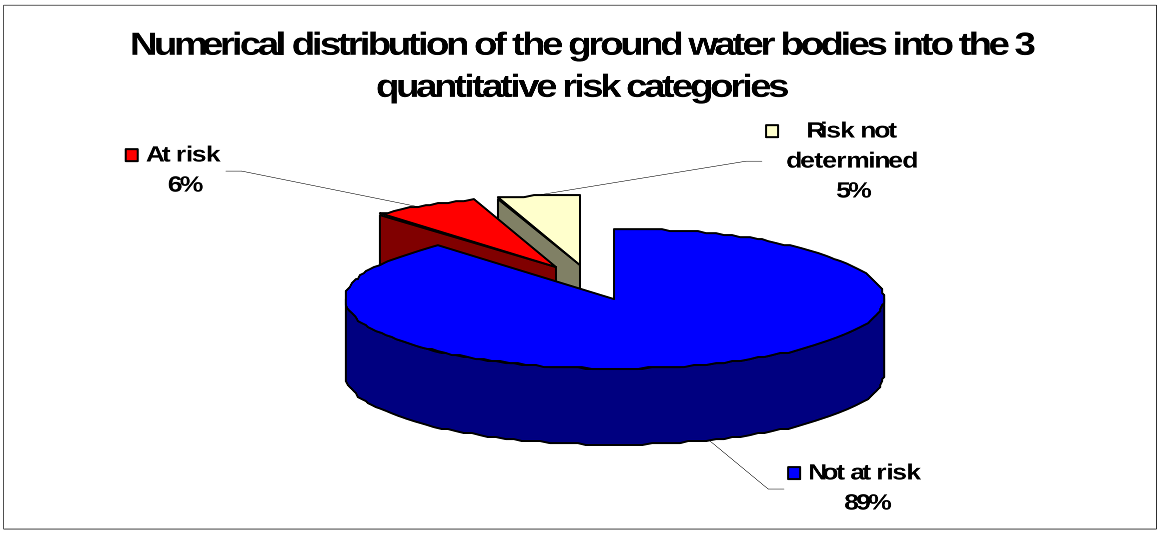
The method for assessing the risks of not achieving good quantitative status by 2015 is relatively homogeneous throughout the district, because all Parties used as criteria balance and trend.

In all States and Regions the methodology is based on an evaluation of the current state of the groundwater bodies ("balance between groundwater abstraction and natural filling"). Moreover, in most States and Regions an extrapolation based on historical trends was carried out, in so far as these were known.

The relation with the surface ecosystems has not yet been established. The Parties will consider this question further.

b) Risk of not achieving the quantitative objectives by 2015

The data available for all States and Regions (with the exception of 5 % of the total GWB area, which is negligible) show that 6,4% (2,771km²) of the total area GWB is considered "at risk" from a quantitative point of view.



[8] WFD Annex II

The table below outlines, for each State and Region, the groundwater body areas that are assessed as being “at risk” or “not at risk” from a quantitative point of view.

Quantitative risk	Unit	France	Luxemburg	Wallonia	Flanders	Netherland	Germany	TOTAL
At risk	area (km²)	876	0	0	718	0	1177	2771
	% from GWB area by State/Region	8	0	0	20	0	30	6
	% from total GWB area	2	0	0	2	0	3	6
Not at risk	area (km²)	9957	169	10290	2785	12247	2810	38258
	% from GWB area by State/Region	92	100	83	80	100	70	89
	% from total GWB area	23	0	24	6	28	7	89
Risk not determined	area (km²)	0	0	2145	0	0	0	2145
	% from GWB area by State/Region	0	0	17	0	0	0	5
	% from total GWB area	0	0	5	0	0	0	5

France

The only water body presenting a quantitative risk in the French part is “1017-Bordure du Hainaut”. The identified risk is due to an increase in abstraction; the indication that balance is not achieved is based on measurements made at a single location.

Luxembourg

The quantitative status is deemed good if groundwater abstraction does not exceed recharge. The risk analysis is based on a water balance including future groundwater abstraction.

None of the Luxembourgian groundwater bodies in the district are to be considered as being “at risk” or of failing good quantitative status because the abstraction rate is low. However, the hydraulic regime of the Upper Lias groundwater body has significantly been altered due to mining activities.

Wallonia

In the case of two groundwater bodies (RWM012 and RWB021), groundwater abstraction has a significant, but local, impact on groundwater levels and on the groundwater baseflow to surface waters. Data available on those local impacts are at present insufficient to assign a quantitative risk to these two groundwater bodies. They were therefore classified as “potentially at risk”. The 19 other groundwater bodies show no quantitative risk.

Flanders

Flanders took the groundwater levels and the water balances as a base for the quantitative risk assessment. The status of the quantitative monitoring network differs substantially from one groundwater body to the other: the amount of piezometers for which measurements of groundwater levels are available is extremely variable.

Taking into consideration water use and the results from the piezometers, the conclusion is that three out of the 10 groundwater bodies in the Meuse RBD should be considered as being at risk from a quantitative point of view. One is a (semi-)phreatic water body of the Meusesystem MS_0200_GWL_2 and the two others are phreatic water bodies from the Brulandkrijt system BLKS_0400_GWL_1m and BLKS_1100_GWL_1m. Groundwater body BLKS_0400_GWL_2m is currently identified as quantitatively at risk because of lack of data.

Note: This first quantitative risk assessment is based on a first evaluation of the available groundwater level measurements. It is possible that further study will lead to different results.

The Netherlands

In the Dutch situation, the water balance is always in equilibrium. The Dutch groundwater systems are open systems so that in case of a water shortage, water can rapidly migrate from neighbouring zones. However, if one takes into account the relationship with ecosystems, as was done in the Dutch national report, a part of the groundwater bodies is possibly at risk.

Germany

The assessment of the quantitative status of GWB in the German part of the Meuse river basin resulted in the conclusion that for GWB situated in the loose-material strata of the southern part of the Lower Rhine district there is, at present, a quantitative risk of not achieving the WFD targets.

This risk is due mainly to the long-standing and still present effects of the extraction of groundwater from lignite opencast mines, which are kept active to contribute to the energy supply.

For groundwater in loose-material substrate, lowering of levels can be observed in all layers and may affect groundwater extraction points and groundwater-dependent ecosystems. It should be noted that other extraction operations in Germany, in the Netherlands and in Flanders, also influence the groundwater balance in the cross border aquifer. The effects of these operations are carefully monitored on this border region.

In certain groundwater bodies (Schwalm area, southern Niers area), the significant influence of the lignite mines is compensated by large-scale recharging of groundwater, mainly in order to preserve the ecological value of these areas. This means that the influence of mining in upper groundwater levels is neutralised and that one may conclude that the objectives of WFD will be achieved. These water bodies were therefore designated as being "not at risk". Extensive monitoring is also carried out in this region.

Due to the progression of lignite mining, rises in groundwater level have until now been limited to a few isolated sites. The negative balances of these groundwater bodies will gradually start adjusting in the longer term.

In contrast to the two previously described instances, there are no quantitative risks in any other groundwater bodies of the German Meuse River Basin, including those in the hard rock of the Eiffel and the Ardennes.

4.2.3 Qualitative Risks

a) Assessment Method

The methods used by the States and Regions for the qualitative assessment of groundwater bodies are specific in several aspects and the possibilities for harmonisation are limited. The evaluation is therefore an aggregation of the respective national/regional evaluations. Even though some parameters are taken into account by all Parties, the methods and criteria used for the evaluation generally differ.

For example, for nitrate, each Party chose a threshold value as the criterion to evaluate risk. However the thresholds vary between 50 mg/l and 25 mg/l, which leads to a different assessment for one same concentration value.

Generally, the risk is evaluated by combining the data originating from monitoring networks and from the known characteristics of the water body in terms of its vulnerability to pollution.

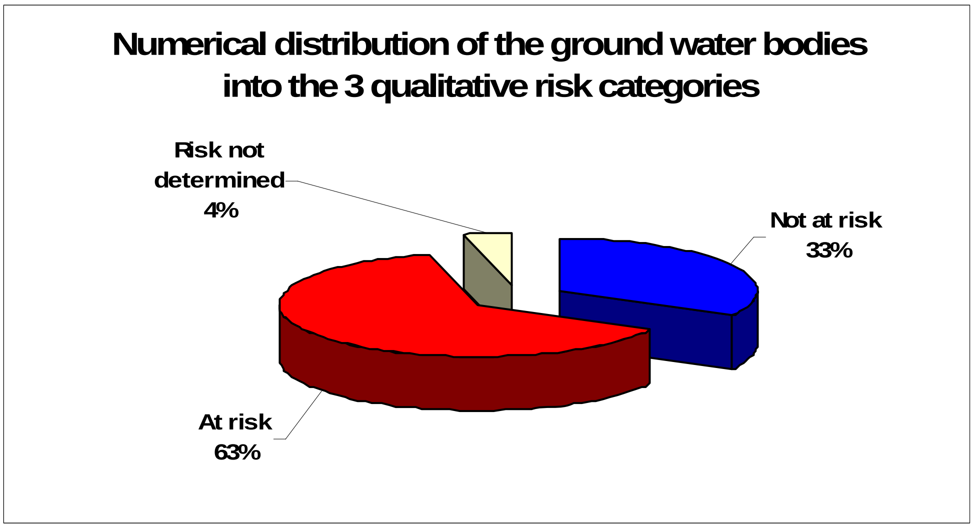
The evaluation of the risk of not achieving the qualitative objectives by 2015 is also based on trends-scenarios developed with the use of historical data (method used in most States/Regions). In some Parties, these data are only partially available, making the evaluation difficult.

In spite of these differences in methodology, it is assumed that there is sufficient comparability to enable the establishment of a map of the (qualitative) risks.

b) Risk of not achieving the objectives by 2015

1. General Evaluation

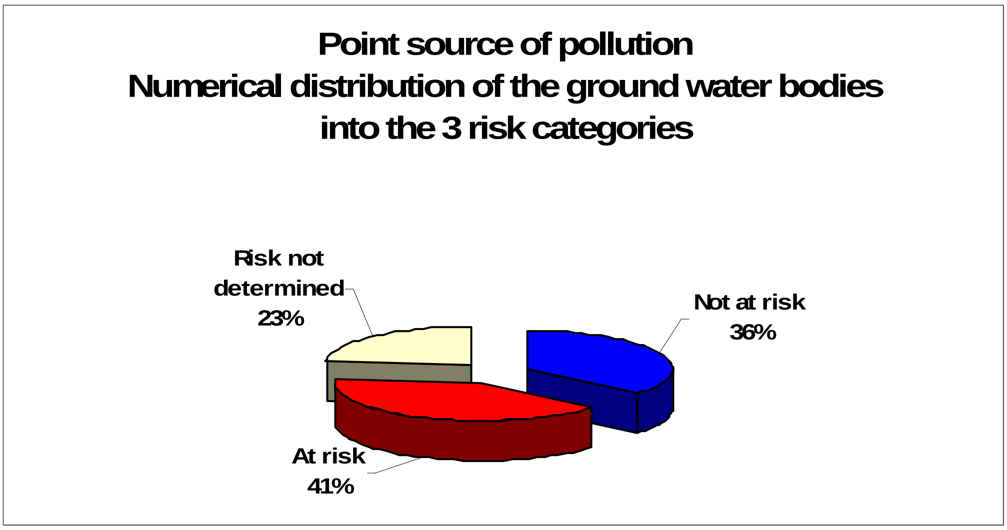
The data available for all States and Regions (except for 4 % of the total GWB surface area, which is negligible), show that 63 % (27.220 km²) of the total GWB surface area is considered "at risk" from a qualitative point of view.

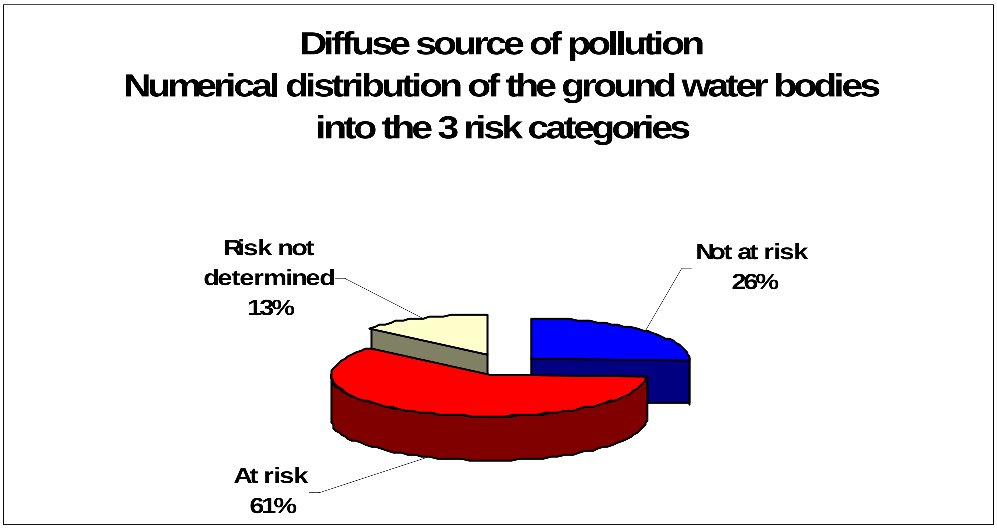


The table below shows, for each State and Region, the groundwater body surface areas evaluated to be "at risk" or "not at risk" from a qualitative point of view.

Qualitative risk	Unit	France	Luxemburg	Wallonia	Flanders	Netherland	Germany	TOTAL
At risk	area (km²)	6.727	0	6.012	2.310	9.079	3.092	27.220
	% from GWB area by State/Region	62	0	48	66	74	78	63
	% from total GWB area	16	0	14	5	21	7	63
Not at risk	area (km²)	3.544	169	5.263	1.193	3.168	895	14.232
	% from GWB area by State/Region	33	100	42	34	26	22	33
	% from total GWB area	8	0	12	3	7	2	33
Risk not determined	area (km²)	562	0	1.160	0	0	0	1.722
	% from GWB area by State/Region	5	0	9	0	0	0	4
	% from total GWB area	1	0	3	0	0	0	4

2. Type of pressures and risks





The table below outlines, for each State and Region, the groundwater body surface areas that are exposed to diffuse and point sources of pollution.

Of the total surface area of the water bodies, 61 % is affected by diffuse sources of pollution, while 40,3 % is affected by point sources of pollution.

Qualitative pressure type	Unit	France	Luxemburg	Wallonia	Flanders	Netherland	Germany	TOTAL
Diffuse source of pollution								
yes	area (km²)	9.917	0	3.484	1.752	8.419	2.781	26.353
	% from GWB area by State/Region	92	0	28	50	69	70	61
	% from total GWB area	23	0	8	4	20	6	61
no	area (km²)	916	169	8.765	0	27	1.206	11.083
	% from GWB area by State/Region	8	100	70	0	0	30	26
	% from total GWB area	2	0	20	0	0	3	26
not determined	area (km²)	0	0	186	1.751	3.801	0	5.738
	% from GWB area by State/Region	0	0	1	50	31	0	13
	% from total GWB area	0	0	0	4	9	0	13
Point source of pollution								
yes	area (km²)	2.139	0	5.891	1.435	6.996	942	17.403
	% from GWB area by State/Region	20	0	47	41	57	24	40
	% from total GWB area	5	0	14	3	16	2	40
no	area (km²)	4.502	169	6.544	0	1.450	3.045	15.710
	% from GWB area by State/Region	42	100	53	0	12	76	36
	% from total GWB area	10	0	15	0	3	7	36
not determined	area (km²)	4.192	0	0	2.068	3.801	0	10.061
	% from GWB area by State/Region	39	0	0	59	31	0	23
	% from total GWB area	10	0	0	5	9	0	23

France

The French section of the Meuse basin (including the Sambre) is subject to strong pressures from agriculture that are exerted on very vulnerable limestone and alluvial formations. There is thus a higher risk of not attaining good chemical status with regard to nitrates and pesticides.

The “1017 Bordure du Hainaut” water body is a particular example: of 13 measuring points, 84,6% show that there are problems with nitrate: 53,8% where the concentration is above 40 mg/l and 30,8% where there is a trend towards increasing concentrations.

The threshold of 20% of the monitoring points showing a higher pesticide concentration than the drinking water standard was exceeded in the following water bodies:

* Limestone on the banks of the Meuse river in the Ardennes (water body 2009).
* Dogger Limestone of the “Plateau de Haye“ (water body 2011).
* Oxfordian limestone (water body 2013).

Moreover, water bodies 2009 (Dogger limestone on the banks of the Meuse river in the Ardennes), 2011 (Dogger limestone of the “Plateau de Haye“), 2013 (Oxfordian limestone), 2015 (alluvial plain of the Meuse, the Chiers and the Bar), 1016 (Avesnois limestone) and 1017 (Bordure du Hainaut) show a significant exposure to nitrates or to pesticides over more than 20% of their area. For these water bodies, the risk of not achieving good chemical status is high.

For the water body 2025 (Kimmeridgian clays), the combined assessment of pressure and vulnerability shows that over 20% of its area has an elevated exposure to this category of pollution. However, this water body is of an “impermeable, local aquifer” type and there are no measurement data allowing to establish whether this elevated exposure results in at least the detection of these substances in the “aquifer” parts of this water body. This water body is therefore at present classified as “in doubt” as to the risk of not achieving good chemical status for these substances. This risk will be assessed further on the basis of a more detailed analysis.

Luxembourg

The qualitative risk analysis takes into account the results from monitoring stations (current status) and emission factors. The evaluation of the qualitative status is based on a limit value corresponding to 75 % of the limit value for drinking water. Furthermore, current inputs are taken into account in the analyses of the potential risk.

A groundwater body is to be qualified as at risk :

- If more than a third of the monitoring points exceed 75% of the limit value for drinking water.
- less than a third of the monitoring points exceed the 75% threshold, but there are significant inputs.

None of the Luxembourgian groundwater bodies in the Meuse river district is to be considered as being at risk of failing good qualitative status.

Wallonia

The risk of not achieving good chemical status was assigned to 10 of the 21 groundwater bodies in Wallonia, which represents about 48% of the area of the Wallonian part of the Meuse district. A significant and representative impact is observed for 6 of those groundwater bodies.

For the 4 other groundwater bodies at qualitative risk, in order to reach a conclusion about risk, an assessment of the combined effects of pressure and vulnerability was necessary, as a complement to the analysis of the observed impacts.

Point sources of pollution are one of the causes of qualitative risk for 9 of the 10 groundwater bodies “at risk”, while diffuse sources of pollution are a cause for 6 of these 10 groundwater bodies.

Qualitative risk assessment further leads to the classification of 5 groundwater bodies as being “potentially at risk” due to the lack of data on pressures and vulnerability which might have supplemented available local and non-representative information on impacts, or a lack of impact data.

The six other groundwater bodies are not at (qualitative) risk.

The main diffuse pressures identified at the scale of the district originate from agricultural activities, with nitrate and pesticide as the main sources of pollution. The main point sources of pollution are contaminated sites; waste disposal sites; industrial and agricultural infrastructure; and untreated household wastewater.

Concerning the observed impacts, the significant diffuse pollutants found in groundwater are nitrates and pesticides. Other substances that significantly pollute groundwater are considered to originate from point sources.

Flanders

The assessment of the risk of not achieving the qualitative objectives by 2015 confirms the results obtained from measurements carried out for nitrates in the phreatic monitoring network, as well as from an assessment of the most significant point sources. The assessment is also the result of a combination of indicators such as the current anthropogenic pressure; the pressure expected in future; the intrinsic vulnerability of the groundwater body and the recently observed excesses in nitrate concentrations.

There is a qualitative risk of not reaching good qualitative status by 2015 for six groundwater bodies in the IRBD Meuse This applies to all uppermost phreatic groundwater bodies (MS_0100_GWL_1, CKS_0220_GWL_1, BLKS_0160_GWL_1m, BLKS_0400_GWL_1m and BLKS_1100_GWL_1m) and one (semi-) phreatic groundwater body located deeper (MS_0200_GWL_1). For four deeper groundwater bodies, there is no qualitative risk: (MS_0200_GWL_2 and CKS_0200_GWL_2, BLKS_0400_GWL_2m and BLKS_1100_GWL_2m).

The Netherlands

Qualitatively, all groundwater bodies are suitable for human consumption: they do not show any effects of salt or other intrusions.

Although the quality of the most superficial groundwater bodies is not satisfactory, the average quality complies with the values set by the Directive on the protection of groundwater (for nitrates and pesticides). Only in South Limburg (limestone groundwater body) does the average nitrate concentration exceed the standard.

Due to a lack of information about pesticides, the national report indicates that a large part of the groundwater bodies is potentially at risk.

Germany

The assessment of the chemical status in the German part of the Meuse river basin district led to the conclusion that almost all groundwater bodies consisting of coarse material, are currently at risk as regards complying with the objectives of the WFD. By contrast, for the hard-rock groundwater bodies there is a serious risk in only a few groundwater bodies (four out of ten), situated in the Aachen-Düren area that is strongly influenced by industry, human settlements and mining.

For most of the groundwater bodies in the German Meuse river basin district, the risk of pressures due to chemicals (i.e., NO3, and NH4, SO4) originates from diffuse pollution, in particular that resulting from intensive agricultural activities.

The good chemical status of many groundwater bodies is at risk because of high sulphate concentration. This is due to intense mining activities (e.g. spoil tips from coal mining, opencast mining operations) and to specific agricultural or industrial pressures.

The groundwater bodies in opencast mines (Inden open-cast mine, GWK 282_06, and Garzweiler open-cast mine, GWK 286_08) are influenced by intensive pyrite oxidation.

A small deviation of the pH-threshold value of 6,5 in some groundwater bodies in hard rock formations (parts of the Rur, Niers, Schwalm and Rodenbach river basins) can be attributed to acid rain. Another consequence of this is that the limit value for nickel is exceeded..

4.2.4 Ecosystems

It should be emphasised that the risk evaluations were based only on quantitative or qualitative indicators rather than on criteria allowing an evaluation of the possible impact of groundwater bodies on terrestrial ecosystems and on surface waters.

As already stated in Section 4.2.1, sufficiently detailed information about this issue is not yet available for the district as a whole. However the national reports show, or at least indicate, possible effects on terrestrial ecosystems.

Some of these effects are or may be “trans-district”. These will be given specific attention in the future.

The possible effects of GWB on ecosystems should be investigated as part of the future monitoring programme. In Germany this is already the case with regard to the lignite mining area.

4.2.5 Summary of the Assessments

As regard of the current state of progress of Parties’ activities and given the evaluation methods that were used so far, it was not possible to provide a unified answer to the question as to whether there is a risk of not achieving, by 2015, the objectives set out in the WFD.

However, the risk assessment showed that less than 10% of the groundwater bodies are considered as being “at risk” from a quantitative point of view, while a little over 60% are considered as being “at risk” from a qualitative point of view. The risk could not be evaluated for about 5% of the ground water bodies.

For some substances, there is insufficient information for the district as a whole to be able to draw general conclusions, but based on the data for nitrate only, one can already conclude that the majority of the groundwater bodies are at risk with respect to chemical status.

40% the total area of groundwater bodies, is affected by point sources of pollution, while 60% is affected by diffuse sources.

At present, the methodology used for delimitating groundwater bodies is specific to each Party. This situation causes problems in the case of trans-boundary groundwater bodies.

5 Identification and Mapping of Protected Areas

5.1 Introduction

The WFD requires the establishment of a register of protected areas, as defined by the following European legislation:

C 4.1 Areas designated for the abstraction of water intended for human consumption
C 4.2 Areas designated for the protection of economically significant aquatic species (fish, shellfish and crustaceans)
C 4.3 Areas designated as recreational and bathing waters
C 4.4 Nutrient-sensitive areas and nutrient vulnerable areas
C 4.5 Areas designated for the protection of habitats (including birds)

The national reports include the registers of the protected areas designated as part of the implementation of the above legislation. Annex 25 shows the transboundary protected areas, or the protected areas of interest for the river basin as a whole.

5.2 Natura 2000 in the International River Basin District

Annex 25 shows the importance of the hydrographic network for the Natura2000 network of protected areas, and the need for international cooperation in this matter. The protection of habitats and species in the IRBD Meuse is strongly linked to surface waters, as many protected zones are situated along Meuse tributaries or in the Meuse valley itself. Significant wetland areas are of course linked to the water system, and in particular to the groundwater system (see Section 4.2.4).

Transboundary initiatives aiming at the conservation of species and habitats are a necessity for transboundary rivers, e.g. the Semois, the “Border” Meuse, the Rur, the Schwalm, the Niers) and for border zones which are often surrounded by large natural areas (Gaume, Hautes Fagnes, Maasduinen).

<u>France</u>

Large stretches of the alluvial plain of the Meuse river are included in the network of protected areas. These are situated in the French departments Meuse and Vosges. The same applies to the Mouzon and Chiers tributaries. Large wetland areas, lakes and swamps (Pagny-s-Meuse) are found In Lorraine.

<u>Wallonia and Flanders</u>

In March 2000, Wallonia designated 165 sites (ca. 21.000 ha). These include several tributary systems and large moorland areas (Hautes Fagnes). In Flanders, 8 “habitat” areas are within the Meuse basin, mainly in tributary valleys and also in the floodplain of the Meuse river itself.

<u>Netherlands</u>

Of 79 protected areas under the “birds” directive, 16 are situated in the Meuse basin; many are connected to the main course of the river. Of the 141 “habitat” areas, 39 are in the Meuse basin. Seven larger protected zones are both “bird” and “habitat” protected areas: the

Biesbosch, Groote Peel, Krammer-Volkerak, Meinweg, Haringvliet, Voordelta en Maasduinen.

Germany

There are, in total, 52 “habitat” areas in the German river basin district, of which the largest are: the “Kermeter” on the Rur, the “Krickenbecker lakes” on the Nette and the “Lüsekampniederung” on the Schwalm. In addition, the “Meuse-Nette-Platte” region including the Grenzwald and Meinweg is of considerable importance at international level.

6 Economic Analysis

6.1 Introduction

In accordance with the WFD, Member States are required to undertake an economic analysis for each river basin district or for the portion of an international river basin district falling within their territory. This economic analysis should consists of three elements; an economic analysis of water use, a description of the baseline scenario, and an estimation of the cost recovery of water services.

In later phases of the implementation of the EU WFD, economic analysis will be used to make judgements, based on the analysis of potential costs, about the most cost-effective combination of measures in respect of the water uses. These will be included in the future programmes of measures and in the water management plan, with the understanding that exemptions may be identified.

Each State / Region within the Meuse district carried out its own economic analysis for its respective part of the river basin, based on its own data and of the results of national studies.

For the district as a whole, coordination consisted of the followed main steps:

- a comparison of the methods used,
- a collection of data on the most important water uses,
- a qualitative assessment of expected developments according to baseline scenarios,
- a collection of data with respect to the recovery of costs of water services.

The aim of these actions was to highlight common issues that could subsequently be presented at the district level. After a short section on methodology, the following sections describe the most important results regarding water uses, baseline scenario and cost recovery.

6.2 Methodology

The methodology used to report on the economic significance of water uses is based on the European NACE-classification[9]. This classification is known to all Parties and is routinely used in statistical reporting of economic data to the European Commission.

In total, 10 NACE - groups and sub-groups were identified. These groups are: “agriculture”, “agro-food”, “textile”, “paper and card”, “chemistry”, “energy”, “metallurgy”, “trade and services” and “public services”. So far, some partners still do not have data available for the sub-group “energy” (NACE code 40). An additional group was identified, namely “households”.

6.3 Water use

6.3.1 Introduction

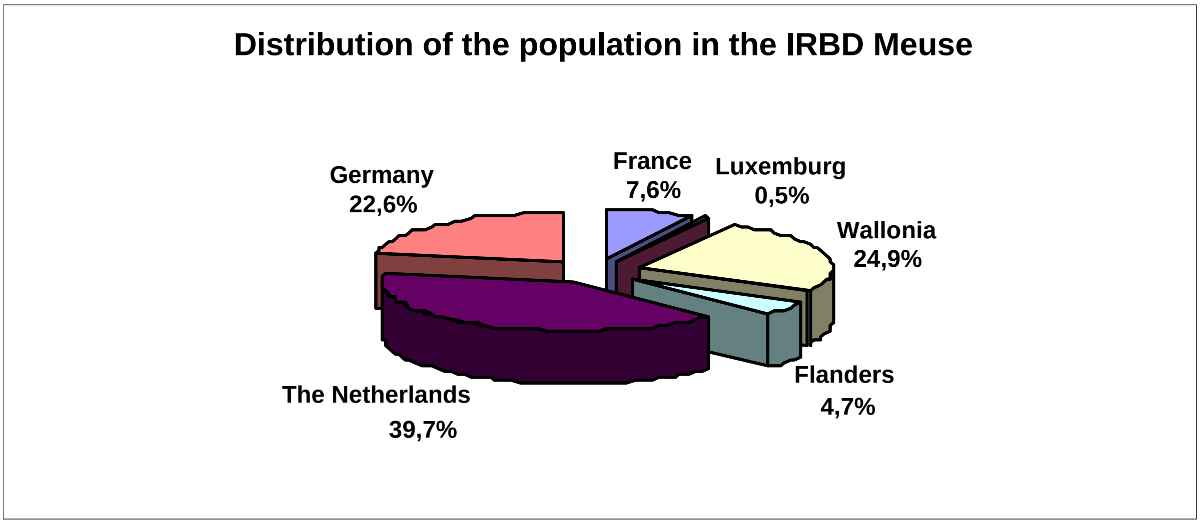
The economic description of water uses is chiefly intended to form an impression of their economic significance. The economic significance of the various activities is described using as indicators added value and employment.

[9] Classification of Economic Activities in the European Community

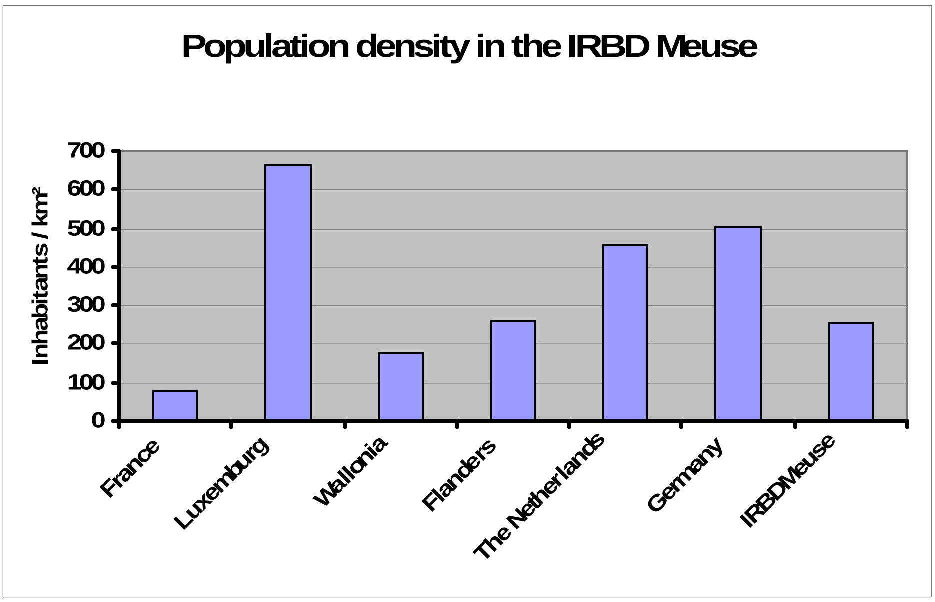
These indicators were chosen because they describe the impact on the economy when certain economic sectors should have to reduce their activities due to restrictions in water use. Households, industry and agriculture are important users of water and they are therefore covered in more detail in the next sections.

6.3.2 Population

The total population in the district is around 8,8 million. Most inhabitants (40%) are residents in the Netherlands. The Walloon Region and Germany have the second largest population in the district, each approximately 25%. France and the Flemish Region have 8% respectively 4% of the population in the district, while Luxemburg has 0,5% of the total (see chart below).



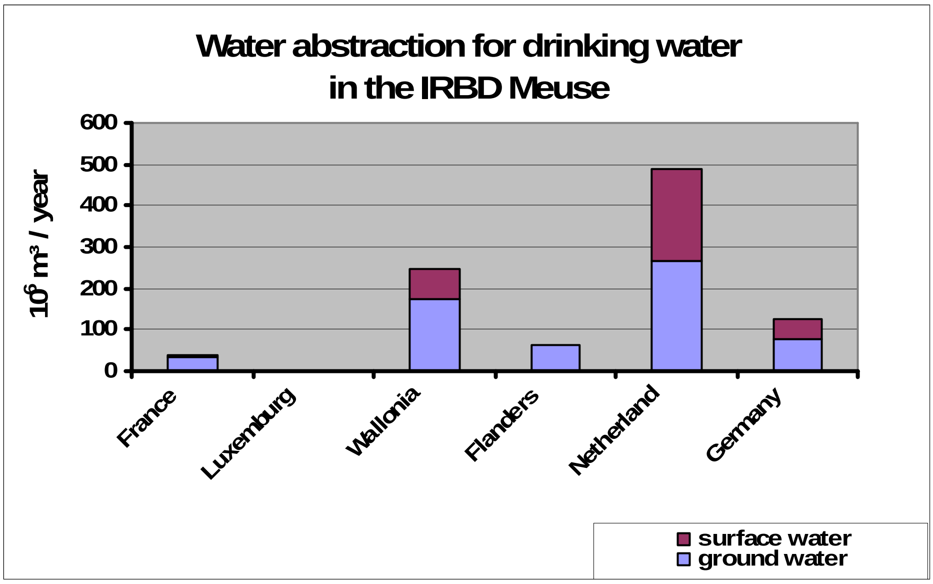
The district has a total area of approx. 34,500 square kilometres, and the average population density is 254 inhabitants per square kilometre. The population is not equally distributed: the highest densities occur in the Netherlands, Germany and Luxemburg (430 to 500 inhabitants/ sq km); while in the French part of the district, the density is lowest (75 inhabitants/sq km). Wallonia and Flanders have a density of 178 and 258 inhabitants/sq km respectively (see histogram below).



6.3.3 Drinking Water

Almost the entire population of the district is connected to a public water supply. The total amount of water abstracted for drinking water purposes is 964 million cubic meters per year, of which 64% is extracted from groundwater, the remainder from surface water.

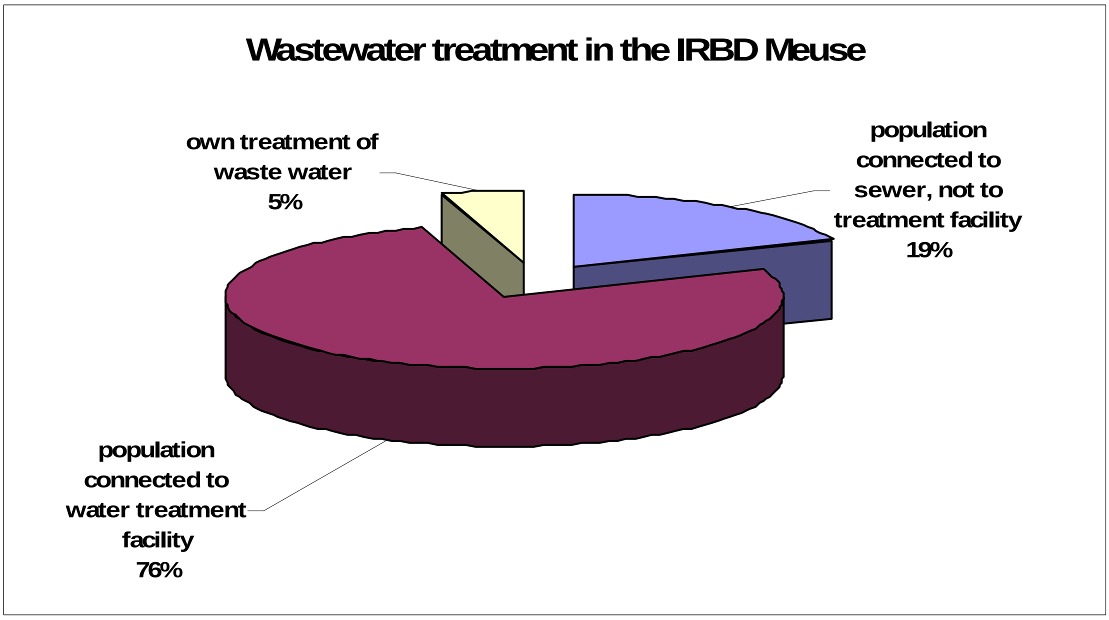
In the Dutch, German and Walloon parts of the district a substantial part of the water abstracted for drinking water is from surface water; 46, 39 and 30% respectively.



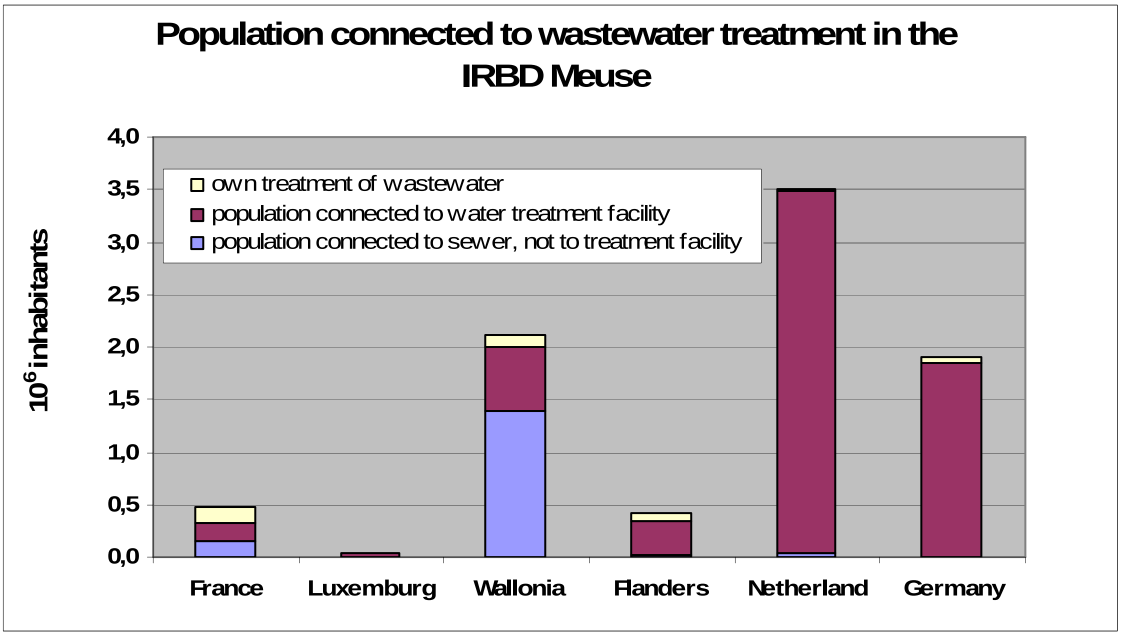
The district provides in total 548 million cubic meters per year for the supply of drinking water.

6.3.4 Municipal Wastewater Treatment

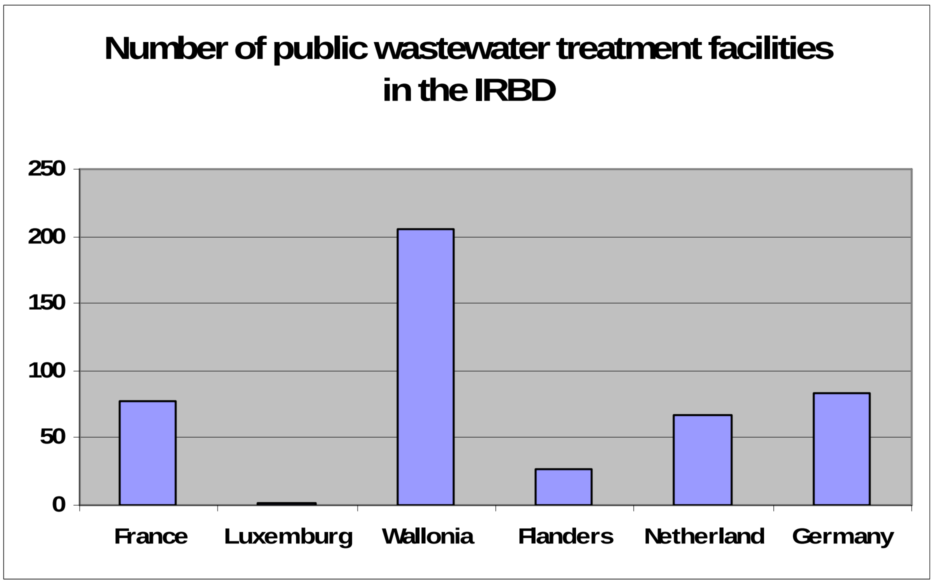
About three quarter of the population in the district is connected to a public wastewater treatment facility. 19% of the district population is connected to a sewer but not to a public treatment facility, and 5% of the population has its own treatment facility.



The situations vary within the district. In the French and Walloon areas, the percentages of public wastewater treatment are 37% and 29% respectively. In the Flemish area, it is 81%, while in the remaining area almost all wastewater from the population is treated. Five percent of the population has its own treatment facility (i.e. septic tank): in France, this amounts to 31%, in Flanders 15%, in Wallonia 5% and in Germany approx. 4%. The situation in the French part of the district is different because a relatively large part of the population lives in communities with less than 500 inhabitants.

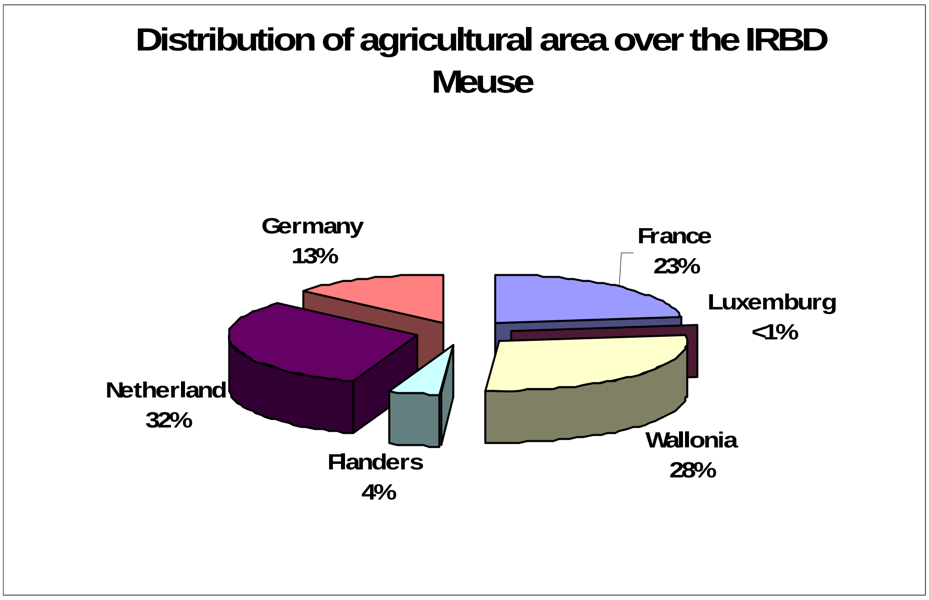


In the Walloon part of the district, 65% of the population is connected to sewers but not to public treatment facilities. In this region, treatment facilities were built in upstream areas of small rivers and watercourses. This policy was developed to significantly reduce the negative impact on the quality of these waters. These areas are relatively thinly populated, which explains why, in spite of the relatively large number of treatment facilities in Wallonia: (205 out of 462 in the district), the percentage of the population connected to a public treatment facility is low in comparison with the other Parties (see diagram below).



6.3.5 Agriculture

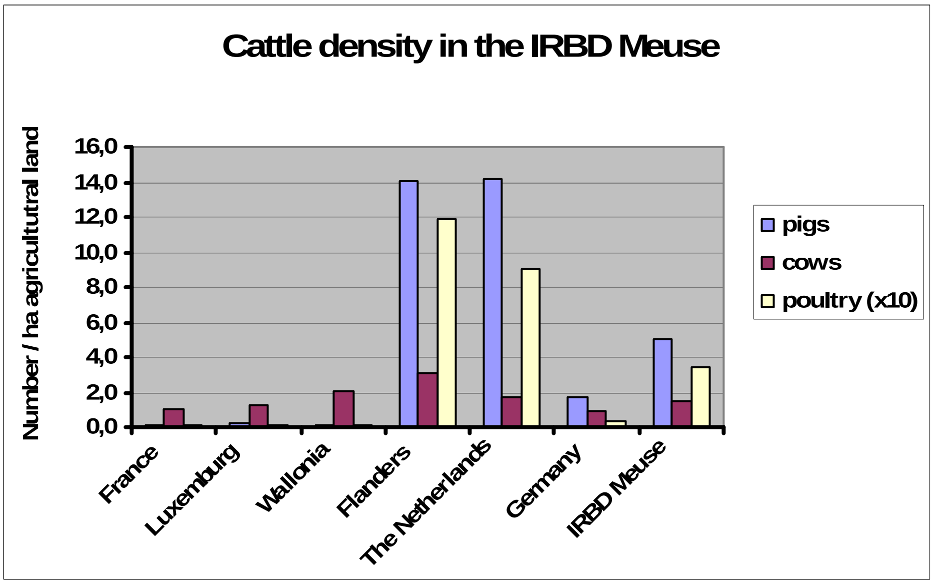
The agricultural area in the IRBD Meuse is 1.720.000 hectares, which is approx. 50 % of the total surface area. The largest agricultural areas are located in the Netherlands (32%), France (23%) and the Walloon Region (28%) (see chart below).



The agricultural sector needs water for crop growth. The amount and quality of water needed, as well as the period when the water is needed, depend on the type of crop. In the Meuse district, sufficient water quantities are mostly available. The amounts abstracted for irrigation are small. In some areas, drainage is needed in periods of excessive water logging. The use of fertilisers and herbicides in too large quantities or in ways that are not environmentally friendly may have negative effects on water quality.

Livestock farming needs good quality drinking water for cattle. Depending on local circumstances, this sector may have a negative effect on water quality due to the manure produced; cattle density can be used as a factor to assess the pressure and the potential impact of this sector on the water quality.

The average number of pigs in the district is a little over five per hectare; the number of cattle 1,6 and the number of poultry 34 per hectare of agricultural land. Cattle and poultry are not equally distributed over the district. The largest densities occur in the Netherlands and Flanders (diagram below).

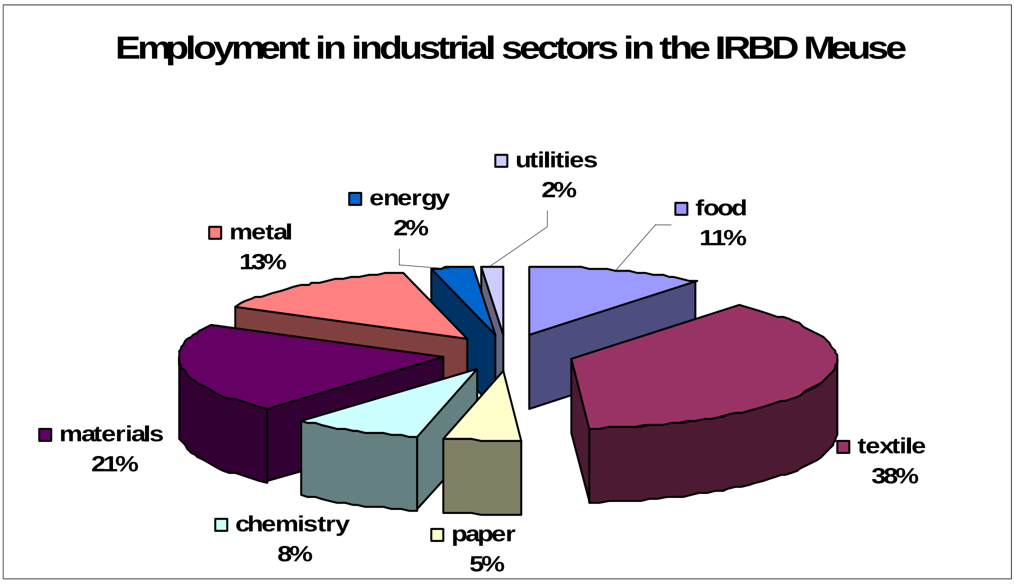


The number of employees in the agricultural sector in the district is a little over 100.000. The added value of the sector is approx. €3,1 billion/year.

6.3.6 Industry

Industrial activities may have a quantitative and/or qualitative effect on the waters of the district. The effects differ according to the industrial sector concerned. The quantitative effect may occur because of the extraction of process water, whereas the qualitative effect is a result of discharge of wastewater into the river. Not all industrial processes are equal in relation to water use: some sectors require water of good quality; others may have a negative effect on the water quality because they discharge polluted water, or may influence water quantity by using large amounts of production and cooling water.

The number of employees in the industrial sector is a little over 700.000 for the whole district. The proportion of employees in the various industrial sectors is shown in the diagram below.



The total added value of the industrial sector is approx. €48 billion euro/year.

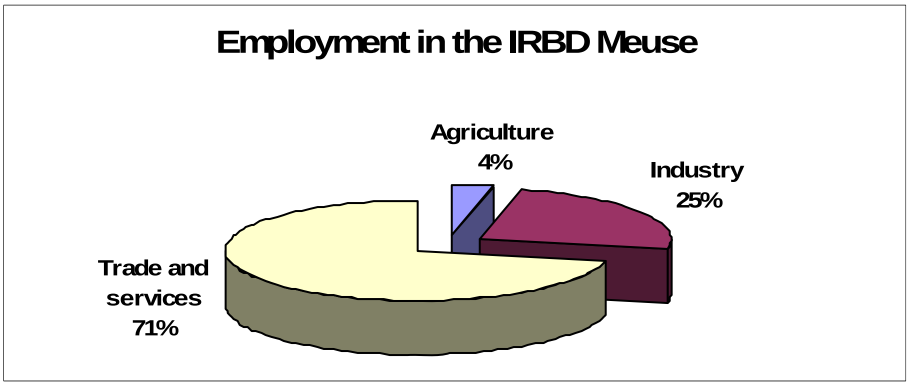
6.3.7 Trade and Services

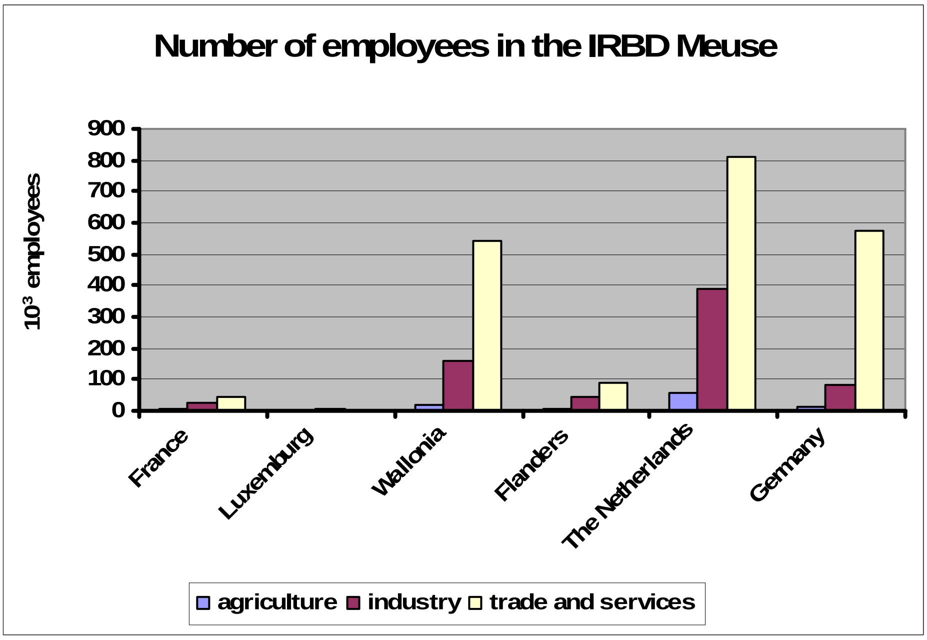
The trade and service sector is mostly insignificant in terms of the pressures it exerts on water. Locally however, enterprises like laundries may not be negligible.

The trade and services sector employs a little over 2.000.000 people in the IRBD Meuse. The added value of the sector is approx. €110 billion euro/year.

6.3.8 Comparison of Economic Sectors

The employment in the trade and services sector accounts for 71% of total employment. This is by far the largest sector compared to industry and agriculture that account for 25% and only 4% respectively.





The trade and services sector is also the largest sector of employment in all national parts of the district whereas agriculture is by far the smallest one.

6.4 Baseline Scenario

Another part of the economic analysis entails the development of a baseline scenario. This baseline scenario describes the foreseeable development over time of the driving forces behind the pressures on the status of water, and can therefore be used to estimate the water status in 2015. These expectations with respect to the water status in 2015 will then be compared with the objectives and thus determine the risk of failing to meet the objective if no additional measures are undertaken.

For some sectors, the Parties are in a position to make a provisional qualitative assessment of the expected future developments in terms of increases or decreases. The table below gives an overview of these expectations.

Expected developments in some sectors + = increase - = decrease, 0 = no development							
	FR	WL	LU	VL	DE	NL	IRBD Meuse
Population	-	+	+	+/0	+	0/+	0/+
Agriculture	-	-	0	-	0/+	-	-
Industry	0	0	0	0	+	0	0
Trade and services	+	+	+	+	+		+
Water treatment	+	+	+	+/0	0/+	0	0/+

The expected demographic developments vary over the district. The general tendency for agriculture is to decrease. This is mainly due to an expected reduction of intensive livestock farming. Most Parties do not expect an increase in industrial activities. Some Parties assume an increase in water treatment, while others do not expect further developments.

It should be stressed that the indications given in the table have a restricted comparability.

There are insufficient data available for other sectors like tourism, navigation, hydropower, fishery and sand- and gravel extraction to include these sectors in the scenarios.

6.5 Cost Recovery

The Parties developed, each for its own uses, a methodology allowing a provisional estimate of the cost recovery of water services to be established. Since data and methods are not comparable between Parties, and sometimes even within the territory of one Party, the figures for cost recovery cannot be compared. They can only be used to indicate whether a Party is close to, reaching total cost recovery. A summary of the various definitions, sources and methods to calculate the percentages of cost recovery can be found at Annex 26.

7 Major Issues relevant to the whole of the International River Basin District

The aim of this report is to provide a basis for identifying major issues, which may need to be coordinated multilaterally and/or bilaterally with a view to the future development of the monitoring programmes, the programmes of measures and the river basin management plan, as required by the WFD.

This international coordination should ensure that Competent Authorities take into account multilateral issues in their respective programmes of measures.

The report makes a first coordinated evaluation of surface and groundwater bodies for the whole of the Meuse district, and allows an assessment to be made of the possibility to reach the objective of good status in 2015.

Parties use different approaches and methods for their analyses and evaluations; it is nevertheless possible to present a broad and general analysis for the whole basin district.

A first set of important steps was made as a result of the current coordination:

- In order to present the results of the analysis at a suitable scale and level of detail, the basin district was divided into working units; these may at a later stage constitute a starting point for a possible identification of international sub-basins.
- a harmonized typology for the main course of the Meuse river was adopted.
- a harmonized methodology for identifying significant hydro-morphological pressures has been adopted.
- a list of five pollutants specific to the Meuse [10] was identified.

This *acquis* should make future international coordination easier.

One of the report's findings is that urbanisation, industrialization, agriculture and navigation are the main driving forces that determine the status of the waters of the IRBD Meuse.

There are different types of pressures:

- emissions, losses and discharges of pollutants;
- sluices, weirs and dams (flood protection, navigation and hydropower generation);
- canalisation, artificial banks and dikes;
- water abstractions (i.e. for canals, agriculture, industry and the production of drinking water);

These pressures result, sometimes individually, sometimes in combination, in the following potential or observed impacts and consequences:

- o for surface water:
    - impairment of ecosystems, including terrestrial ecosystems that interact with the water;
    - hampered circulation of fish;
    - eutrophication, especially in the main course of the river and in coastal waters;
    - potential risk for water uses

[10] Copper, Zinc ,PCB"s, Dichlorvos and Pyrazone

- o for groundwater:
  - influence on terrestrial ecosystems.
  - potential risk for water uses.

The WFD requires an assessment of the likelihood that water bodies will fail to meet the environmental objectives in 2015. This analysis shows that for the whole basin district, about 50% of the natural surface water bodies are considered to be "at risk". Nearly all artificial and heavily modified water bodies that were subject to a risk analysis showed to be at risk. (see chapter 3.5).

Less than 10% of the groundwater bodies are considered to be "at risk" with regard to quantity but more than 60% are assessed to be "at risk" with regard to quality (see chapter 4.2.5).

The following causes for qualifying water bodies as being "at risk" are to be considered to be the main determinants for the basin as a whole:

For surface water

- the usual pollutants: COD (chemical oxygen demand), Nitrogen, Phosphorus;
- pesticides, in particular for the Meuse river : Dichlorvos and Pyrazone;
- micropollutants (including priority substances), in particular for the Meuse river: copper, zinc and PCB"s;
- hydro-morphological modifications and discontinuities in the main course and some of its tributaries.

For groundwater

- Quantitative factors: excessive abstraction (for a limited number of aquifers)
- Qualitative factors: pollution by nitrates, and pesticides.

Moreover, the extraction of groundwater from mines has perturbed the hydrological balance and altered the water flow between surface water and groundwater. Once these activities have ceased a new equilibrium needs to be established.

The risk assessment exercise also demonstrated that the available data and information are not always compatible and do not allow for a harmonised assessment to be drawn up. A more harmonised data management is required, not only because of the need and the willingness to continue the coordination, but also in view of the future reporting obligation of the States and Regions.

Furthermore, the analysis of the characteristics, the study of the impacts of human activity and the economic analysis of water use have highlighted the usefulness of instruments such as harmonized decision support systems (i.e. models and scenarios).

Finally, it should be emphasised that an integrated approach has been taken to the current Action Programme on Flood Protection of the IMC, with a view of linking flood prevention and protection to other objectives, and to the whole of the river basin's ecosystem. This approach opens opportunities for using synergies between flood protection and prevention, and the implementation of the WFD.

8 Annexes

Annex 1: Competent Authorities.
Annex 2: Map "Competent Authorities".
Annex 3: Map "General hydrography".
Annex 4: Map "Relief".
Annex 5: Coordinated typology, tributaries.
Annex 6: Typology of the Meuse main stream.
Annex 7: Map "General typology of the surface water bodies (rivers).
Annex 8: Obstacles to fish passage in the main stream of the Meuse from the mouth to the Chiers.
Annex 9: Synopsis of the hydromorphological pressures by working unit.
Annex 10: Map "Significant hydromorphological pressures: relative importance per working unit".
Annex 11: Inventory of nitrogen emissions per working unit.
Annex 12: Map "Inventory of nitrogen emissions per working unit".
Annex 13: Inventory of phosphorous emissions per working unit.
Annex 14: Map "Inventory of phosphorous emissions per working unit".
Annex 15: Chemical Oxygen Demand per working unit.
Annex 16: Map "Chemical Oxygen Demand per working unit".
Annex 17: Status of the waters bodies per working unit.
Annex 18: Map "Status of the waters bodies".
Annex 19: Map "Status of the waters bodies per working unit".
Annex 20: Water bodies: Risk of failing to meet good status per working unit.
Annex 21: Map " Water bodies: Risk of failing to meet good status per working unit".
Annex 22: Groundwater data in the IRBD Meuse.
Annex 23: Map "Groundwater bodies".
Annex 24: Map "Groundwater bodies: Risk of failing to meet the good status".
Annex 25: Specially protected areas.
Annex 26: Estimates for the cost recovery rates (including definitions, data and methods used for the calculation)

Annex 1

Competent Authorities

In accordance with article 3, indent 3 of the Water Framework Directive, the Parties have identified Competent Authorities for the implementation of the Water Framework Directive in those part(s) of the IRBD Meuse that are within their territory (Annex 2).

Below is the list of Competent Authorities.

France

Sambre

Monsieur le Préfet Coordonnateur de Bassin Artois Picardie
2 rue Jacquemars Giélée 2
59039 Lille

Meuse

Monsieur le Préfet Coordonnateur de Bassin Rhin Meuse
Place de la préfecture 10
57000 Metz

Luxembourg

Ministère de l'Intérieur
rue Beaumont, 19
L-1219 Luxembourg

Belgium

Belgische Federale Regering
Contact person
Roland Moreau, Directeur Generaal
Vesaliusgebouw
Oratoriënberg 20, bus 3 7de verdieping
1010 Brussel
tel +32 (0)2 210 44 88;
fax +32 (0)2 210 46 99

Flemish Region

Coördinatiecommissie Integraal Waterbeleid
A. Van de Maelestraat 96
9320 Erembodegem
België
CIW-sec@vmm.be
http://www.ciwvlaanderen.be
tel: +32 (0)53 726 507
fax: +32 (0)53 726 630

Walloon Region

Gouvernement Wallon
Cabinet du Ministre Président
Rue Mazy, 25-27
5100 Jambes (Namur)
Belgique

The Netherlands

1. The "Minister van Verkeer en Waterstaat" (Minister for Transport), where necessary jointly with the Ministers of VROM and the LNV

Name of the Competent Authority	Postal Address	Address	Home page
Minister van Verkeer en Waterstaat	Postbus 20901 2500 EX Den Haag	Plesmanweg 1-6 2597 JG Den Haag	www.verkeerenwaterstaat.nl
Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer	Postbus 20951 2500 EZ Den Haag	Rijnstraat 8 2515 XP Den Haag	www.minvrom.nl
Minister van Landbouw, Natuur en Voedselkwaliteit	Postbus 20401 2500 EK DEN HAAG	Bezuidenhoutseweg 73 2594 AC Den Haag	www.minlnv.nl

2. The authorities of provinces whose territories are either entirely or partially situated within the District

Name of the Competent Authority	Postal Address	Address	Home page
Provincie Limburg	Postbus 5700 6202 MA Maastricht	Limburglaan 10 6229 GA Randwijck-Maastricht	www.limburg.nl
Provincie Noord-Brabant	Postbus 90151 5200 MC Den Bosch	Brabantlaan 1 Den Bosch	www.brabant.nl
Provincie Gelderland *	Postbus 9090 6800 GX Arnhem	Markt 11 6811 CG Arnhem	www.gelderland.nl
Provincie Zuid-Holland	Postbus 90602 2509 LP Den Haag	Zuid-Hollandplein 1 Den Haag	www.zuid-holland.nl

3. The authorities of the water boards that are either entirely or partially situated within the District

Name of the Competent Authority	Postal Address	Address	Home page
Waterschap Peel en Maasvallei	Postbus 3390 5902 RJ Venlo	Drie decembersingel 46 5921 AC Venlo	www.wpm.nl
Waterschap Roer en Overmaas	Postbus 185 6130 AD Sittard	Parklaan 10 6131 KG Sittard	www.overmaas.nl

* The territory is situated outside the river basin, but there are significant linkages which need to be taken into account in the establishment of the management plan.

Name of the Competent Authority	Postal Address	Address	Home page
Hoogheemraadschap Alm en Biesbosch [1]	Postbus 5 4285 ZG Woudrichem	Middelvaart 1 4285 WS Woudrichem	www.almenbiesbosch.nl
Waterschap De Dommel	Postbus 10001 5280 DA Boxtel	Bosscheweg 56 5283 WB Boxtel	www.dommel.nl
Waterschap Aa en Maas	Postbus 5049 5201 GA DEN BOSCH	Pettelaarpark 70 5216 PP Den Bosch	www.aaenmaas.nl
Waterschap Brabantse Delta	Postbus 5220 4801 DZ BREDA	Bergschot 69 4817 PA BREDA	www.brabantsedelta.nl
Waterschap Rivierenland *	Postbus 599 4000 AN TIEL	Gebouw Waalzicht Westluidensestraat 46 4001 NG Tiel; Gebouw Beatrixlaan Prinses Beatrixlaan 25 4001 AG Tiel	www.waterschaprivierenland.nl
Waterschap de Brielse Dijkring *	Postbus 19 3230 AA BRIELLE	Waterschapshuis De Rik 22 3232 LA BRIELLE	www.iwbp.nl
Waterschap Goeree Overflakkee	Postbus 67 3240 AB Middelharnis	Dwarsweg 40 3241 LB MIDDELHARNIS	www.wsgo.nl
Waterschap Groote Waard *	Postbus 7010 3286 ZG Klaaswaal	Rijksstraatweg 3b 3286 LS Klaaswaal	www.iwbp.nl
Zuiveringschap Hollandse Eilanden en Waarden	Postbus 469 3300 AL Dordrecht	Johan de Wittstraat 40 Dordrecht	www.zhew.nl

* beheersgebied geheel of vrijwel geheel buiten het stroomgebied, maar er zijn wel relaties die voor het stroomgebiedbeheersplan e.a. van belang zijn.

4. The authorities of communes whose territories are either entirely or partially situated within the District [2]

Vereniging van Nederlandse Gemeenten
Postbus 30434
2500 GK Den Haag
Nassaulaan 12, Den Haag
In April 2004, 483 communes were member of the VNG.

Germany

Ministerium für Umwelt und Naturschutz, Landwirtschaft und Verbraucherschutz des Landes Nordrhein-Westfalen,
Schwannstraße 3
40476 Düsseldorf

[1] The Hoogheemraadschap Alm en Biesbosch is currently still part of the Meuse hydrographic district. When it formally participated to the geographical delimitation for the purposes of the WFD, the Hoogheemraadschap stated that it wished to belong to the Rhine hydrographic basin. The Minister of Verkeer en Waterstaat's answer is still pending. His reaction will only be definitive after a change in the law on the implementation of the WFD has been approved by the Second Chamber. This is expected to happen in June 2004.

[2] The communes have not been mentioned either in the list nor on the maps, in view of the limited direct role played by the communal councils in the implementation of the WFD, compared to the administrative duties mentioning these data (and subsequently amending them) would bring about. The address of the Vereniging van Nederlandse Gemeenten, or association of Dutch communes, has nevertheless been mentioned.

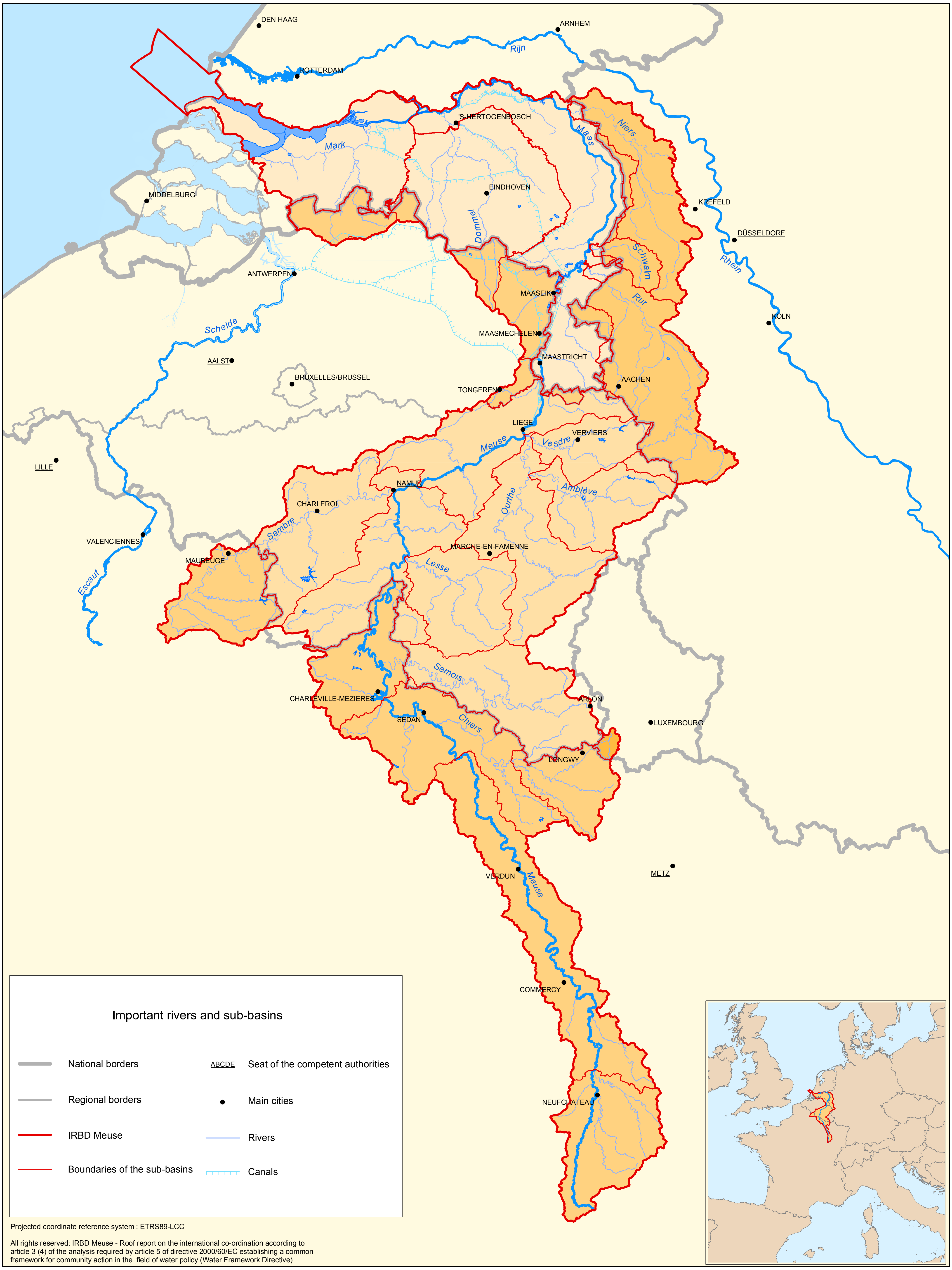
Annex 2

IRBD Meuse - Competent Authorities

Projected coordinate reference system : ETRS89-LCC

Annex 3

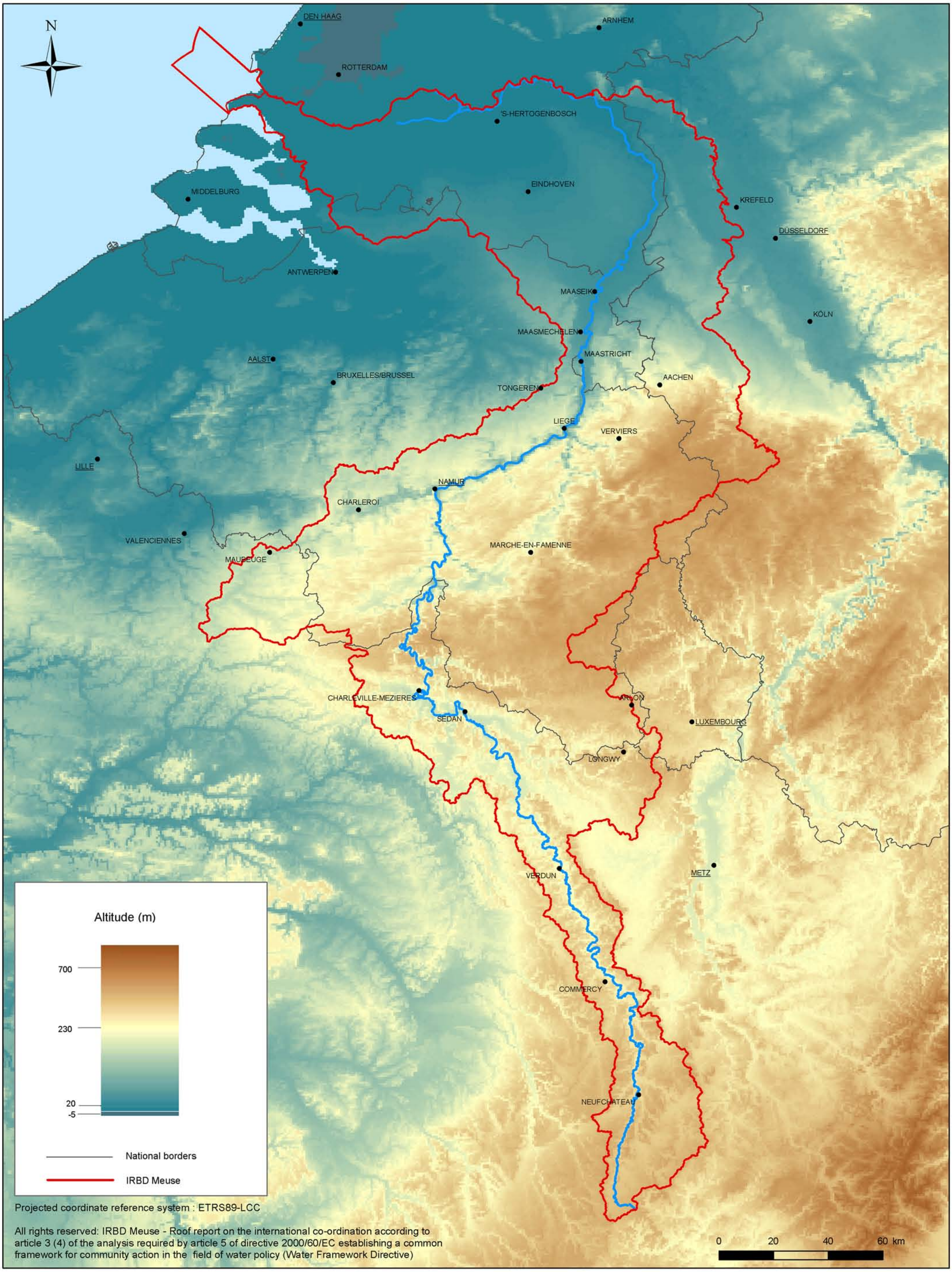
IRBD Meuse - General Hydrography



Projected coordinate reference system : ETRS89-LCC

Annex 4

IRBD Meuse - Relief



Projected coordinate reference system : ETRS89-LCC

Annex 5

IRBD Meuse - Coordinated typology, tributaries

1. Hydro-ecoregions	2. Differentiated geology	3. Global geology	4. States / Regions	5. Rivertype	6. Size	7. Ecomorphological type / slope	8. NrType	9. Number WB
Limestone areas	Limestone areas (Shell-limestone, Jura, Malm, Lias, Dogger, Cretaceous period, Devon)	c	DE	Type 7 calcareous streams in mid-altitude mountains	small	I	1	6
				Type 9.1 calcareous rivers in mid-altitude mountains	large	I	2	0
HER 10 – Eastern Calcareous escarpments	marl and limestone alternately (Jurassic)	c	FR	1. Chalk and marl rivers, small and large, predominantly calm, w temperate to cold water. Locally, small rivers with rapidly flowing cold water	small	S I C	1	87
					large	S I C	2	6
Belgian Lorraine	Sand, marl and limestone (Jurassic and Triassic)	c	WL	rivers and streams of Lorraine	small, medium	S I	1	19
			LU			S		1
Ardennes	Shale, sandstone. & phyllite - Cambrium en Lower Devonian	s	WL	rivers and streams of the Ardennes	small, medium	S I	3	109
					large	S	4	1
Eifel	Silicate mountain base	s	DE	Type 5 Siliceous streams in mid-altitude mountains	small	S	3	49
				Type 9 Siliceous rivers in mid-altitude mountains	large	S	4	14
HER 99 Ardennes	Cambrium and Devonian base (shale)	s	FR	2. Siliceous rivers of the Ardennes massif; large streams with calm and cold water ; local small streams with rapid flow and cold water	small	S I C	3	25
					large	S I C	4	3
chalk, moraines, river terraces	Siliceous moraines, riverterraces, eroded chalky areas	s	DE	Type 16:stony lowland streams	small	C	5	15
				Type 17: stony lowland streams	large	C	6	6
		s	NL	R13: upper courses of small streams, w rapid flow on sandy bottom R14: middle/or lower courses of small stream, w rapid flowi on sandy bottom	small (<100km²)	big slope (> 1 m/km)	5	21
				R15 rapidly flowing rivulet on silicious soil	medium (100-200km²)	big slope (> 1 m/km)	6	2
Condroz	Devonian and Carboniferous	c	WL	Rivers and streams of the Condroz	small, medium	S I	5	70
					large	I C	6 ??	3 1
HER 98 Famenne	calcareous	c	FR	Small calcareous rivers with rapidly flowing cold water 3. type rarely found in France (border rivulets)	small	S	7	3
Famenne	Upper Devonian shales	c	WL	Streams and rivers of the Famenne	small, medium	S I	7	31
					large	I	8	2
Loam area	Loam (Loess) on Carboniferous limestone, Cretaceous and Tertiary	c	WL	Rivers and streams of the Loam area	small, medium	S I	9	17
Sandy loam Loam area	Loam (Quaternary) on Jurassic and Cretaceous limestone	s	VL	Rivers and streams of the Loam area	small (<100 km²)		9	7
					large (100-300km²)		10	2
					small (300-1000km²)		10*	2
Loess area	Loess	s	DE	typ 18: Loess-loam lowland streams		C	9	27
		s	DE DE	Typ 19 Lowland rivers Typ 20 Lowland streams		C	10	46
		c	NL	R 17: upper courses of small streams w rapid flow on calcareous soil R18: middle and lower courses of small streams w rapid flow on calcareous soil	small (<100km²)	big slope (> 1 m/km)	9	27
Sand, moraines	Sand, accumulations/moraines of sand	s	DE	typ 14-15: Sandy and loamy lowland rivers		C	11-12	7
Kempen/ Campine	Oligotrophic sandy soils with acid properties (Myocenic and quaternary sands)	s	VL	Streams of the Kempen	small stream (< 100 km²)		11	37
					large stream (100-300 km²)		12	2
		s	NL	R3: Upper course of temporary small stream w calm flow on sandy bottom R3: Upper course of permanent small stream w calm flow on sandy bottom R5: middle course of small stream w calm flow/ lower course on sandy bottom	small (10-100km²)	small slope (< 1m/km)	11	107
				R6: slowly flowing small river on sand/clay	medium (100-200km²)	small slope(< 1m/km)	12	11
				R7: slowly flowing river on sandy/clay bottom	large (>200 km2)		12*	4
	organic peat soil	o	DE	Typ 11 organic lowland streams	small	C	13	13
		o		Typ 12 organic lowland rivers	large	C	14	15
		o	NL	R11 upper course of river, slowly flowing on peaty soil	small (<100km²)	small slope (< 1m/km)	13	6

s: silicatious

c: calcareous

o: organic

Types < 10km² not mentioned	**Size** 1) **FR** according to Strahler-orders rows 1 to 3 = small rows 4 and more = large or 2) **WL** according to basin surface - stream (small) = basin surface < 100km² - river (middle) = basin surface100-1000km² - largeriver (large) = basin surface 1000-10000 km² - very large river (very large) = basin surface >10000 km² (only Meuse, see other table)	S = Salmonoid / rapidly flowing I = Mixed (calm&cold/rapidly flowing&cold) C = cyprinic (calm & moderate)

FR	Canals	
WL		
VL		7
NL		
DE		

Annex 6

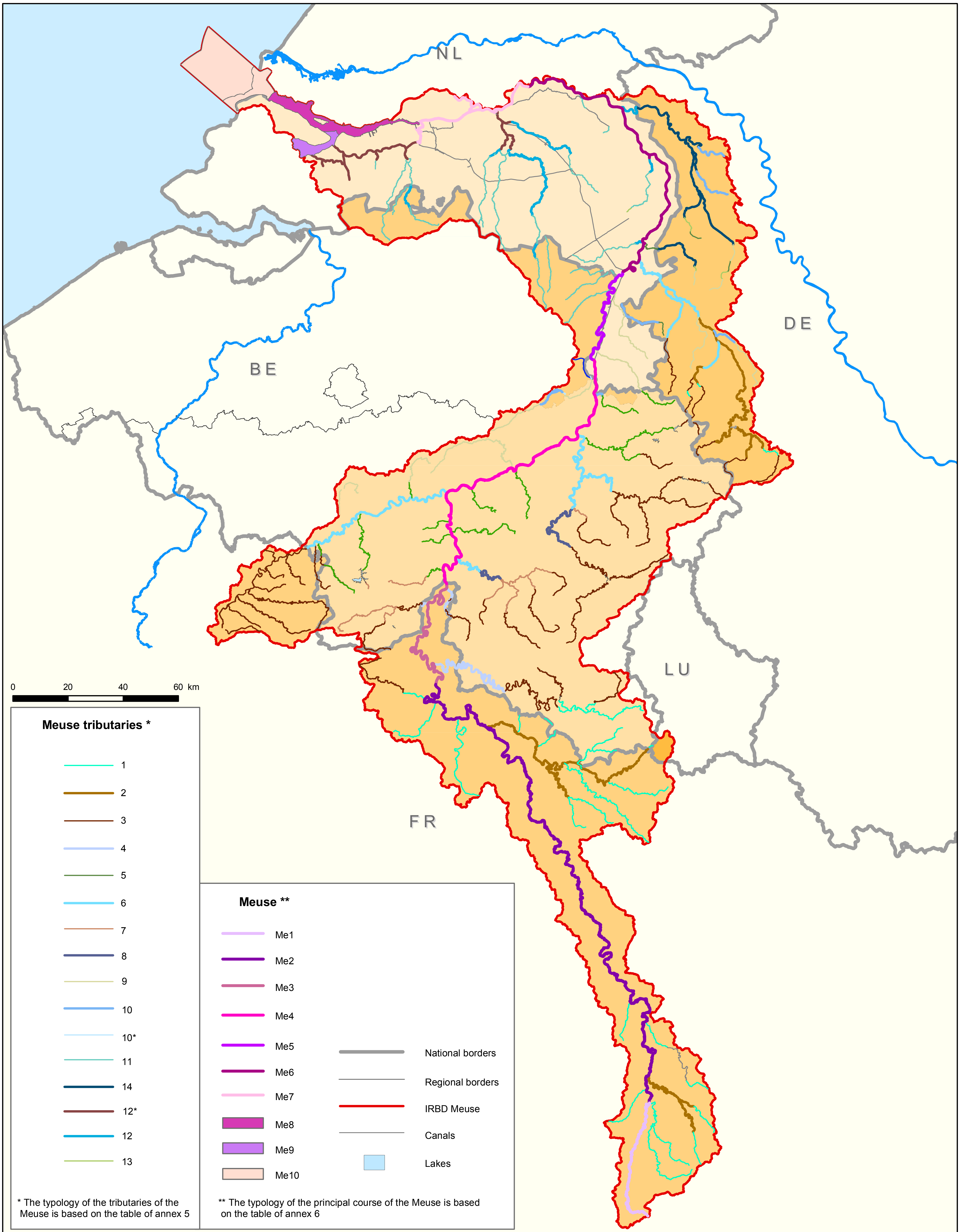
Typology of the principal course of the Meuse

1. Sub-ecoregions	2. Meuse sections	3. Ecoregion and altitude category	4. Global geology	5. River type	6. States / Regions	7. International code	8. National type	9. Number of Water bodies
Haute-Marne Plateau de Langres	1. Le Châtelet-sur-Meuse - Neufchâteau (confluence of the Mouzon)	8. Western highlands 200-800m	c	Small river on chalk and marl, w mostly calm and cold water	FR	Me1	P10i	2
	2 Neufchâteau - Nouzonville (confluence of the Goutelle)	8. Western highlands 200-800m	c	Large river on chalk and marl, w mostly calm and temperate water	FR	Me2	G10c	5
Ardennes	3. Nouzonville -French-Belgian border	8. Western highlands 200-800m	s	Large siliceous river of the Ardennes massif; wide stream w cold and temperate water	FR	Me3	G99c	1
Condroz	4. French-Belgian border - Borgharen	13 Western plains < 200m	c	Very large river of the Condroz w small slope (canalised river) / Slow flowing river on sand/clay (NL)	WL-NL	Me4	WL: Very large river of the Condroz - NL: R7	2 of which one transboundary water body
Kempisch plateau - Limburg hilly county	5. Borgharen - Maasbracht Grensmaas (Border Meuse)	13 Western plains < 200m	s	Rapidly flowing large river on gravel	VL-NL	Me5	VL: very large river - NL: R 16	3 (VL 2+NL 1)
Kempen	6. Maasbracht - Lith (Zandmaas en Bedijkte Meuse) (Sandmeuse and	13 Western plains < 200m	s	Slowly flowing lower course on sand/clay	NL	Me6	R7	2
Land van Maas en Waal	7. Lith - Waalwijk (Benedenmaas) (Lower Meuse)	13 Western plains < 200m	s	fresh intertidal water on sand/clay	NL	Me7	R8	1
Biesbosch - Rhine-Meuse delta	8. Waalwijk - Haringvlietdam (Bergsche Maas, Biesbosch, Amer-Hollands Diep-Haringvliet)	13 Western plains < 200m	s	fresh intertidal water on sand/clay	NL	Me8	R8	3
Biesbosch - Rhine-Meuse delta	9. Krammer Volkerak	13 Western plains < 200m	s	Medium sized, deep buffer lake	NL	Me9	M20	1
Coast	10. Haringvlietdam-12 miles zone (Northern delta coast)	13Western plains < 200m	s	Transitional waters/ estuary	NL	Me10	K3	2

c: calcareous
s: siliceous

Annex 7

IRBD Meuse - General typology of the surface water bodies (rivers)



Projected coordinate reference system : ETRS89-LCC

Annex 8

Obstacles to fish passage in the main stream of the Meuse from the mouth to the Chiers

n^r	Obstacles		Fish passing devices	
	Present	Planned	Present	Planned
	the Netherlands			
1	Haringvliet sluices		impassable entrance	sluices to be set ajar in 2008
2	Weir Lith		upstream; fish passage	
	Hydro-electric power station Lith		downstream: no fish pushing away device	
3	Weir Grave		upstream: no fish passage	fish passage 2006
4	Weir Sambeek		upstream; fish passage	
5	Weir Belfeld		upstream; fish passage	
7	Weir Roermond		upstream; fish passage	
8	Weir Linne		upstream; fish passage	
	Hydro-electric power station Linne		downstream: no fish pushing away device	
9	Weir Borgharen		upstream: no fish passage	fish passage 2006
		Hydro electric power station Borgharen		fish pushing away device
	Wallonia			
10	Weir Lixhe		upstream; fish passage	
	Hydro-electric power station Lixhe		downstream: fish pushing away device	
11	Weir Monsin		upstream; fish passage	
	Hydro-electric power station Monsin		downstream: no fish pushing away device	
12	Weir Ivoz-Ramet		upstream: fish passage	
	Hydro electric power station Ivoz-Ramet		downstream: no fish pushing away device	
13	Weir Ampsin-Neuville		upstream: fish passage	new fish ladder
	Hydro electric power station Ampsin-Neuville		downstream: no fish pushing away device	
14	Weir Andenne		upstream: fish passage	
	Hydro electric power station Andenne		downstream: no fish pushing away device	
15	Weir Grand- Malades		upstream: fish passage	
	Hydro electric power station Grand Malades		downstream: no fish pushing away device	
16	Weir La Plante*		upstream: fish passage *	
17	Weir Tailfer *		upstream: fish passage *	
18	Weir Riviere *		upstream: fish passage *	
19	Weir Hun *		upstream: fish passage *	
20	Weir Houx *		upstream: fish passage *	
21	Weir Dinant *		upstream: fish passage *	
22	Weir Anseremme *		upstream: fish passage *	
23	Weir Waulsort		upstream: fish passage	
24	Weir Hastière		upstream: fish passage	
	France			
25	Weir Givet		upstream: fish passage	
	Hydro electric power station Givet		downstream : no fish pushing away device	
26	Weir Chooz		upstream: fish passage	
28	Weir Ham sur Meuse		upstream: fish passage	
28	Weir Mouyon/Vireux-Wallerand		upstream: fish passage	
29	Weir Montigny sur Meuse		upstream: fish passage	
30	Weir Fépin		upstream: fish passage	
31	Weir Vanne-Alcorps/Haybes		upstream: fish passage	
32	Weir l' Uf/Fumay		upstream: fish passage	
	Hydro electric power station l' Uf/Fumay		downstream: no fish pushing away device	
33	Weir Saint-Joseph/Fumay		upstream: fish passage	
	Hydro-electric power station Saint-Joseph/Fumay		downstream: no fish pushing away device	
34	Weir Revin		upstream: fish passage	
	Hydro electric power station Revin		downstream: no fish pushing away device	
35	Weir Orzy/Revin		upstream: fish passage	
	Hydro electric power station Orzy/Revin		downstream: no fish pushing away device	
36	Weir Damed de Meuse/Laifour		upstream: fish passage	
37	Weir Laifour		upstream: fish passage	
38	Weir Monthermé		upstream: fish passage	
	Hydro electric power station Monthermé		downstream: no fish pushing away device	
39	Weir Lefrézy/Bogny sur Meuse		upstream: fish passage	new fish ladder
	Hydro electric power station Lefrézy/Bogny sur Meuse		downstream: no fish pushing away device	
40	Weir Joigny sur Meuse		upstream: fish passage	
41	Weir Montcy-Saint Pierre		upstream: fish passage	
42	Weir Faubourg de Pierre/Charleville-Mézieres		upstream: fish passage	
	Hydro electric power station Faubourg de Pierre/Charleville-Mézieres		downstream: no fish pushing away device	
43	Weir Romery		upstream: fish passage	
44	Weir Dom le Mesnil		upstream: fish passage	
45	Weir Donchery		upstream: fish passage	
	Hydro electric power station Donchery		downstream: no fish pushing away device	
46	Weir La Tour/Glaire **		upstream: no fish passage **	
47	Weir Roidon/Sedan		upstream: no fish passage	new fish ladder
	Hydro-electric power station Roidon/Sedan		not in use any more	

Legend
Obstacle passable due to the presence of fish passing devices, fish fences or fish pushing away devices
Obstacle disposes of fish passing device, fish fences or fish pushing away device, but not sufficiently effective
Obstacle is not passable due to lacking fish passing device, fish fences or fish pushing away device
Obstacle disposes of fish passing device, fish fences or fish pushing away device but it is uncertain whether these are sufficiently efficient
* Obstacle is passable due to the presence of fish passing device, fish fences or fish pushing away device, but adaptation is necessary to allow passage by large salmonoid fish
** Obstacle does not dispose of a fish passing device but may be passable during high water and possibly also during average flow periods

Planned works
According to IMC publication of 07-02-2002; Obstacles to fish passage in the Meuse from the mouth to the Chiers
Brought up to date for the Netherlands; this should be done as well for Wallonia and France

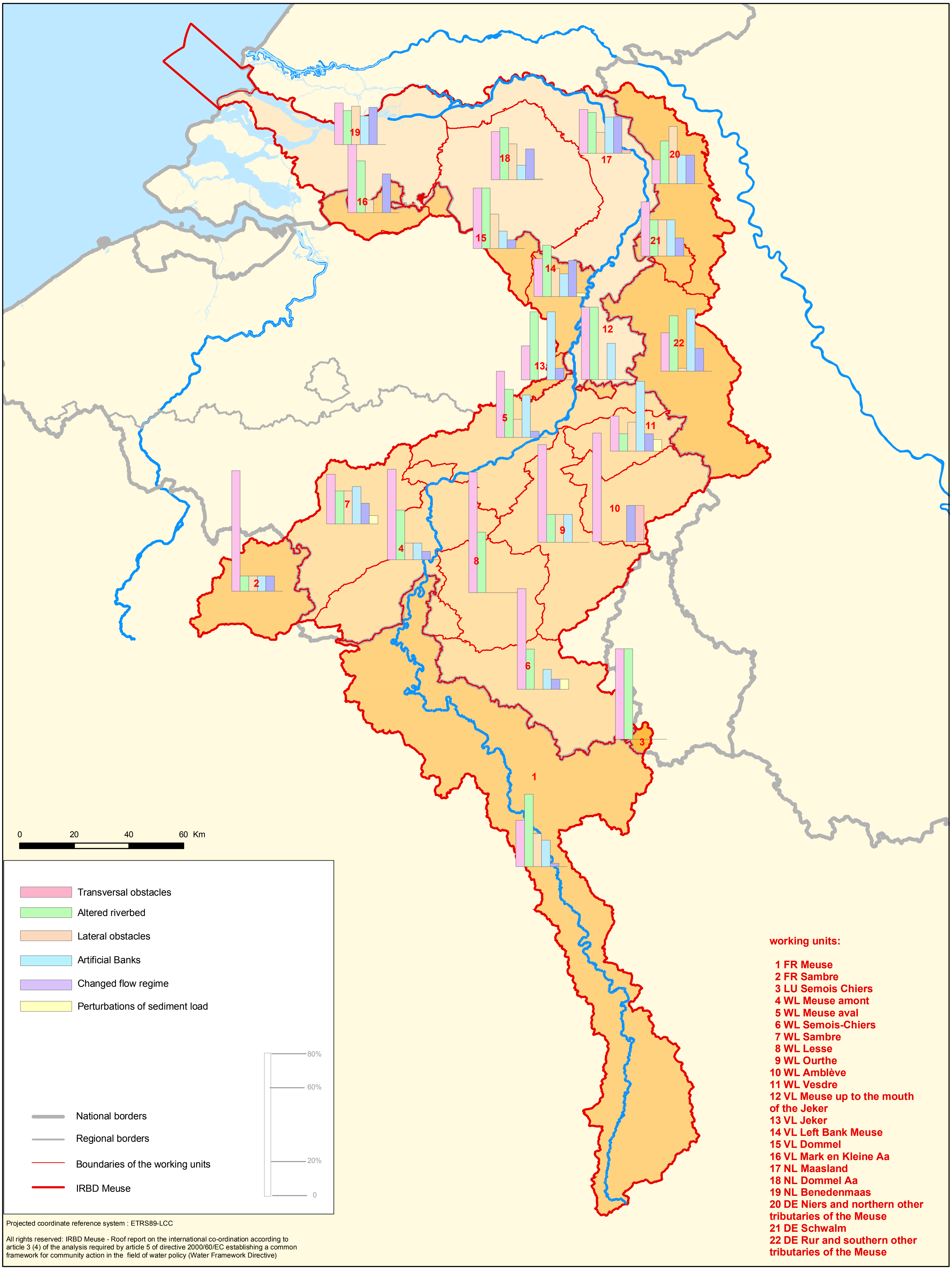
Annex 9

Synopsis of the hydromorphological pressures by working unit

Working units			Total WB	Scores	Transversal obstacles	Altered riverbed	Lateral obstacles	Artificial banks	Changed flow regime	Perturbations of sediment load
1	FR	Meuse	133	Irreversible significant pressures	4	4	8	6	0	0
				Reversible significant pressures	10	18	2	2	1	0
				Non Significant pressures	119	111	123	125	132	133
2	FR	Sambre	10	Irreversible significant pressures	1	1	1	1	1	0
				Reversible significant pressures	7	0	0	0	0	0
				Non Significant pressures	2	9	9	9	9	10
3	LU	Semois-Chiers	1	Irreversible significant pressures	1	1	0	0	0	0
				Reversible significant pressures	0	0	0	0	0	0
				Non Significant pressures	0	0	1	1	1	1
4	WL	Meuse upper course	25	Irreversible significant pressures	7	5	5	4	1	0
				Reversible significant pressures	5	3	3	5	4	2
				Non Significant pressures	13	17	17	16	20	23
5	WL	Meuse lower course	37	Irreversible significant pressures	10	4	2	2	1	0
				Reversible significant pressures	1	2	0	0	0	0
				Non Significant pressures	26	31	35	35	36	37
6	WL	Semois-Chiers	35	Irreversible significant pressures	8	5	1	4	1	0
				Reversible significant pressures	3	3	2	3	0	0
				Non Significant pressures	24	27	32	28	34	35
7	WL	Sambre	41	Irreversible significant pressures	4	2	0	2	1	0
				Reversible significant pressures	6	2	0	0	0	1
				Non Significant pressures	31	37	41	39	40	40
8	WL	Lesse	29	Irreversible significant pressures	3	1	0	0	0	0
				Reversible significant pressures	3	2	0	0	0	0
				Non Significant pressures	23	26	29	29	29	29
9	WL	Ourthe	33	Irreversible significant pressures	5	1	2	2	0	0
				Reversible significant pressures	2	1	0	0	0	0
				Non Significant pressures	26	31	31	31	33	33
10	WL	Amblève	16	Irreversible significant pressures	5	0	0	0	2	2
				Reversible significant pressures	1	0	0	0	0	0
				Non Significant pressures	11	17	17	17	15	15
11	WL	Vesdre	21	Irreversible significant pressures	6	0	4	10	2	2
				Reversible significant pressures	0	3	1	2	1	0
				Non Significant pressures	15	18	16	9	18	19
12	VL	Meuse up to the mouth of the Jeker	4	Irreversible significant pressures	0	1	0	1	0	0
				Reversible significant pressures	2	1	0	0	0	0
				Non Significant pressures	2	2	4	3	4	4
13	VL	Jeker	6	Irreversible significant pressures	3	5	0	5	1	0
				Reversible significant pressures	0	1	0	1	0	0
				Non Significant pressures	3	0	6	0	5	6
14	VL	Left bank of Meuse	31	Irreversible significant pressures	9	19	17	11	19	0
				Reversible significant pressures	11	12	2	5	0	0
				Non Significant pressures	15	4	16	19	16	35
15	VL	Dommel	9	Irreversible significant pressures	2	5	3	1	1	0
				Reversible significant pressures	5	3	2	2	0	0
				Non Significant pressures	3	2	5	7	9	1
16	VL	Mark and Kleine Aa	9	Irreversible significant pressures	2	2	1	0	1	0
				Reversible significant pressures	4	2	0	0	2	0
				Non Significant pressures	3	5	8	9	6	9
17	NL	Maasland	155	Irreversible significant pressures	9	26	25	5	41	1
				Reversible significant pressures	87	64	21	74	39	6
				Non Significant pressures	59	65	109	76	75	148
18	NL	Dommel Aa	122	Irreversible significant pressures	2	22	8	1	15	0
				Reversible significant pressures	72	58	47	21	32	1
				Non Significant pressures	38	32	57	90	65	111
19	NL	Benedenmaas	46	Irreversible significant pressures	23	18	33	1	30	0
				Reversible significant pressures	16	14	3	26	5	0
				Non Significant pressures	7	14	10	19	11	46
19*	NL	North Sea	2	Irreversible significant pressures	0	0	0	0	0	0
				Reversible significant pressures	1	0	1	0	0	0
				Non Significant pressures	0	1	0	1	1	1
20	DE	Niers and various nothern tributaries of the Meuse	60 (54+6)	Irreversible significant pressures	1	1	1	0	1	0
				Reversible significant pressures	4	8	11	6	5	0
				Non Significant pressures	55	51	48	54	54	60
21	DE	Schwalm	14	Irreversible significant pressures	1	0	0	0	0	0
				Reversible significant pressures	2	2	2	2	1	0
				Non Significant pressures	11	12	12	12	13	14
22	DE	Rur and various southern tributaries of the Meuse	125 (117+8)	Irreversible significant pressures	10	2	0	2	9	0
				Reversible significant pressures	44	76	4	87	23	0
				Non Significant pressures	71	47	121	36	93	125

Annex 10

IRBD Meuse - Significant Hydromorphological pressures: relative importance per working unit



Annex 11

Inventory of nitrogen emissions per working unit

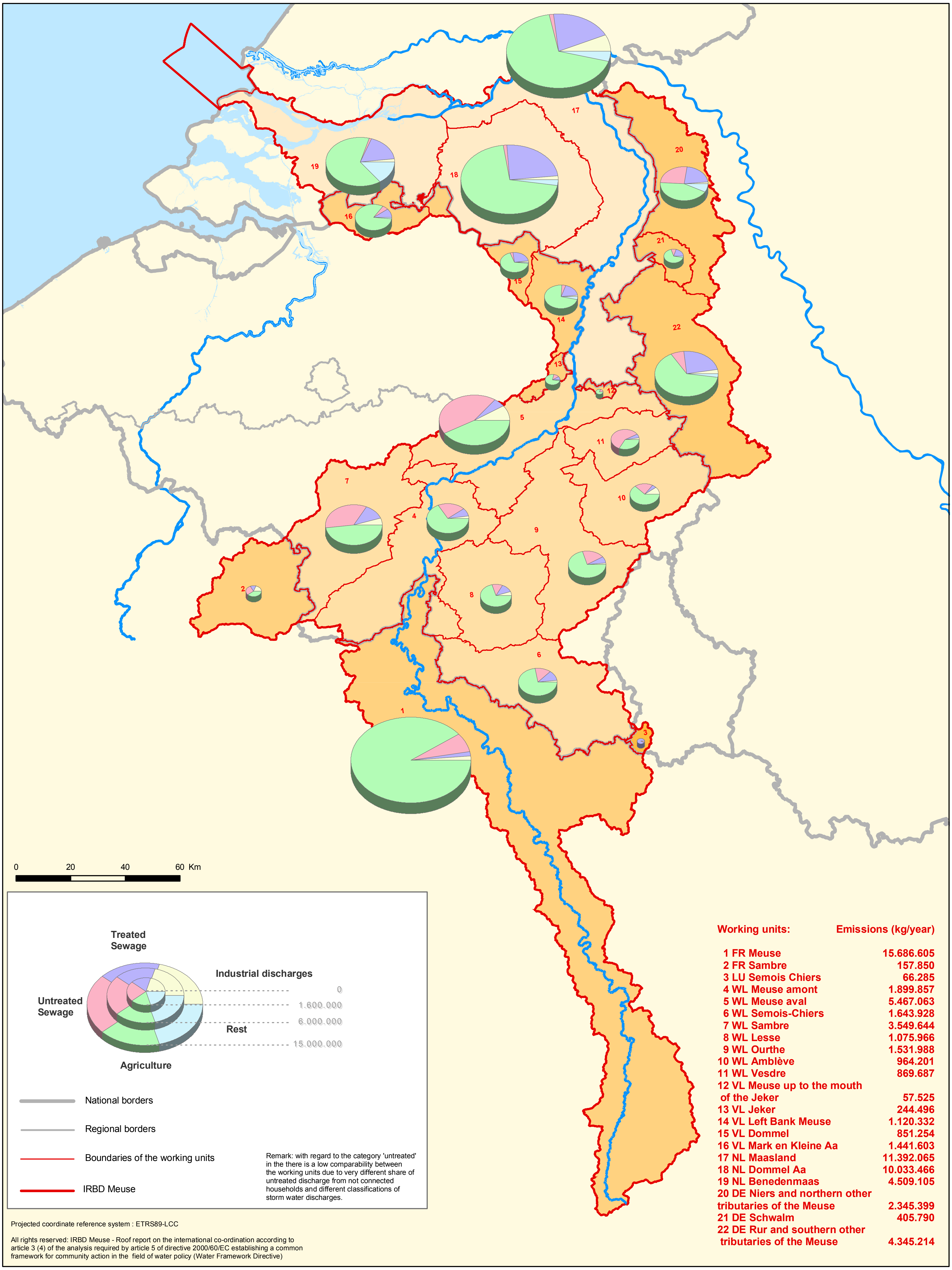
Working units	Industrial discharges	Treated Sewage	Untreated Sewage	Agriculture	Rest
1 FR Meuse	56 200	126 500	978 000	14 525 905	-
2 FR Sambre	50 000	41 055	66 795	109 500	-
3 LU	0	62 477	3 808	0	-
4 WL Meuse upper course	4 291	142 395	483 702	1 421 470	-
5 WL Meuse lower course	442 586	288 960	2 396 962	2 338 555	-
6 WL Semois-Chiers	11 104	170 706	263 093	1 199 025	-
7 WL Sambre	154 418	419 293	1 265 543	1 710 390	-
8 WL Lesse	47 800	130 646	146 350	751 170	-
9 WL Ourthe	454	98 496	347 893	1 085 145	-
10 WL Amblève	89 450	48 375	227 046	599 330	-
11 WL Vesdre	18 506	44 380	512 976	293 825	-
12 VL Meuse up to the mouth of the Jeker	0	0	11 141	46 385	-
13 VL Jeker	0	21 980	31 925	190 590	919
14 VL Lieft Bank of Meuse	21 094	209 528	59 896	829 815	37 571
15 VL Dommel	16 206	219 735	33 498	581 815	10 327
16 VL Mark and Kleine Aa	9 676	133 660	79 705	1 238 563	20 019
17 NL Maasland	690 791	2 509 176	116 825	8 075 272	429 355
18 NL Dommel Aa	53 047	2 575 259	89 628	7 315 532	226 880
19 NL Benedenmaas	80 728	883 367	60 946	3 484 065	698 903
20 DE Niers and various northern tributaries of the Meuse	34 413	532 659	669 327	1 109 000	167 332
21 DE Schwalm	1 118	82 072	45 600	277 000	11 400
22 DE Rur and various southern tributaries of the Meuse	110 894	1 071 720	361 600	2 801 000	90 400
Tot IRBD Meuse (kg/year)	**1 892 775**	**9 812 440**	**8 252 258**	**49 983 351**	**1 693 106**

% IRBD Meuse	**2,64**	**13,69**	**11,51**	**69,80**	**2,36**

Remark : The comparability of data between Parties is low due to very different share of untreated discharge connected household and different classifications of storm water discharges

Annex 12

IRBD Meuse - Nitrogen emissions per working unit



Annex 13

Inventory of phosphorous emissions per working unit

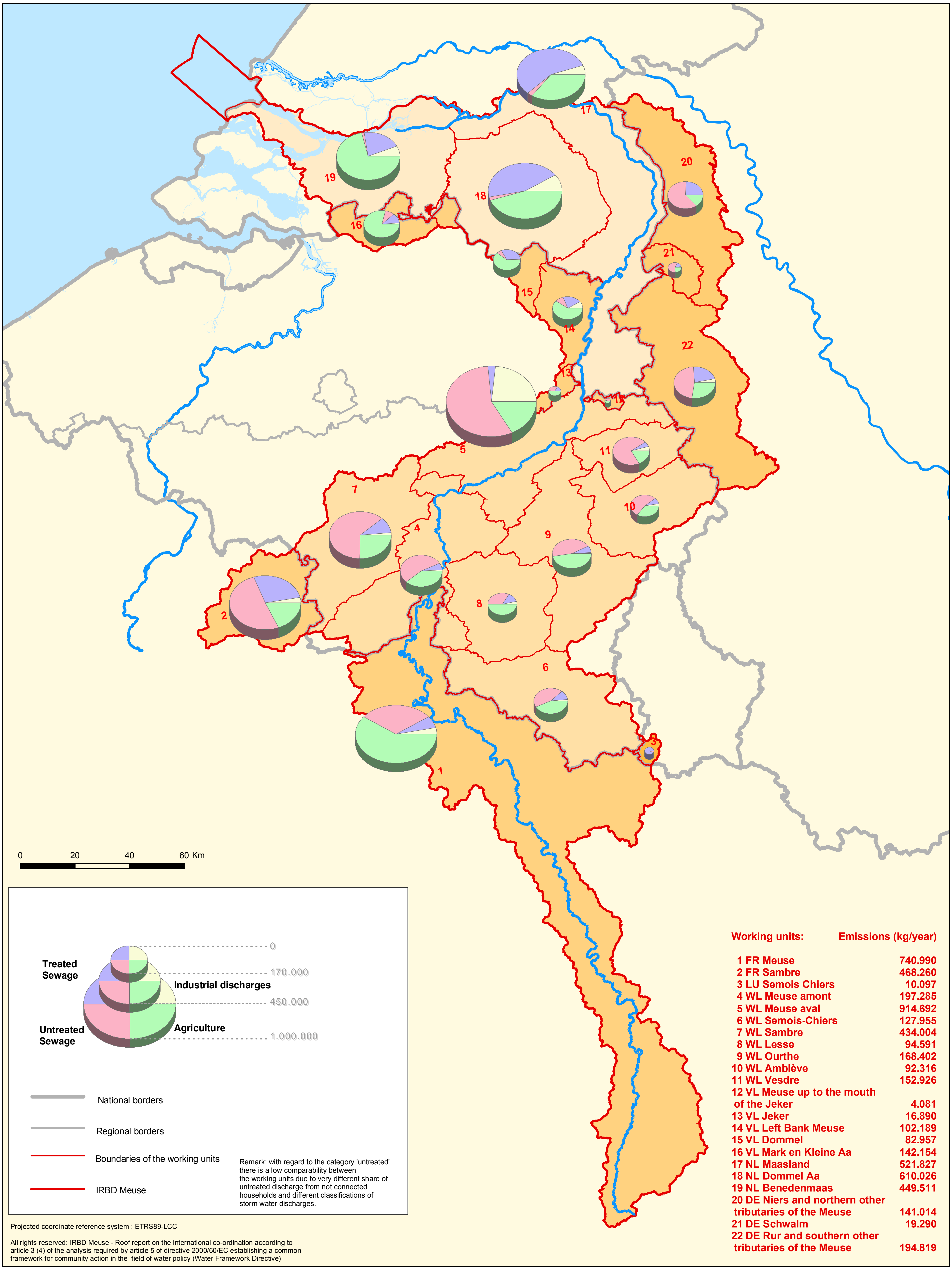
Working units	Industrial discharges	Treated Sewage	Untreated Sewage	Agriculture
1 FR Meuse	22 300	41 100	243 300	434 290
2 FR Sambre	15 000	163 450	289 810	100 375
3 LU	0	9 469	628	7 000
4 WL Meuse upper course	415	11 651	106 819	78 400
5 WL Meuse lower course	212 212	29 760	525 420	147 300
6 WL Semois-Chiers	214	13 607	57 733	56 400
7 WL Sambre	6 512	41 278	276 115	110 100
8 WL Lesse	3 105	12 271	32 115	47 100
9 WL Ourthe	355	10 368	76 579	81 100
10 WL Amblève	2 107	7 500	50 009	32 700
11 WL Vesdre	6 664	7 925	112 838	25 500
12 VL Meuse up to the mouth of the Jeker	0	0	1 894	2 187
13 VL Jeker	0	2 904	5 427	8 559
14 VL Lieft Bank of Meuse	8 279	23 178	10 182	60 549
15 VL Dommel	959	26 183	5 695	50 120
16 VL Mark and Kleine Aa	327	14 483	13 550	113 793
17 NL Maasland	24 074	296 223	13 074	188 455
18 NL Dommel Aa	50 360	272 349	10 031	277 287
19 NL Benedenmaas	25 830	97 930	6 821	318 931
20 DE Niers and various northern tributaries of the Meuse	0	34 272	88 442	18 300
21 DE Schwalm	359	2 891	11 440	4 600
22 DE Rur and various southern tributaries of the Meuse	6 258	44 461	90 400	53 700
Tot IRBD Meuse (kg/year)	**385 330**	**1 163 252**	**2 028 322**	**2 216 747**

% IRBD Meuse	**6,60**	**19,91**	**34,72**	**37,95**

Remark : The comparability of the data between the parties is low due to very different share of untreated discharge connected household and different classifications of storm water discharges

Annex 14

IRBD Meuse - Phosphorous emissions per working unit



Annex 15

Chemical Oxygen Demand per working unit

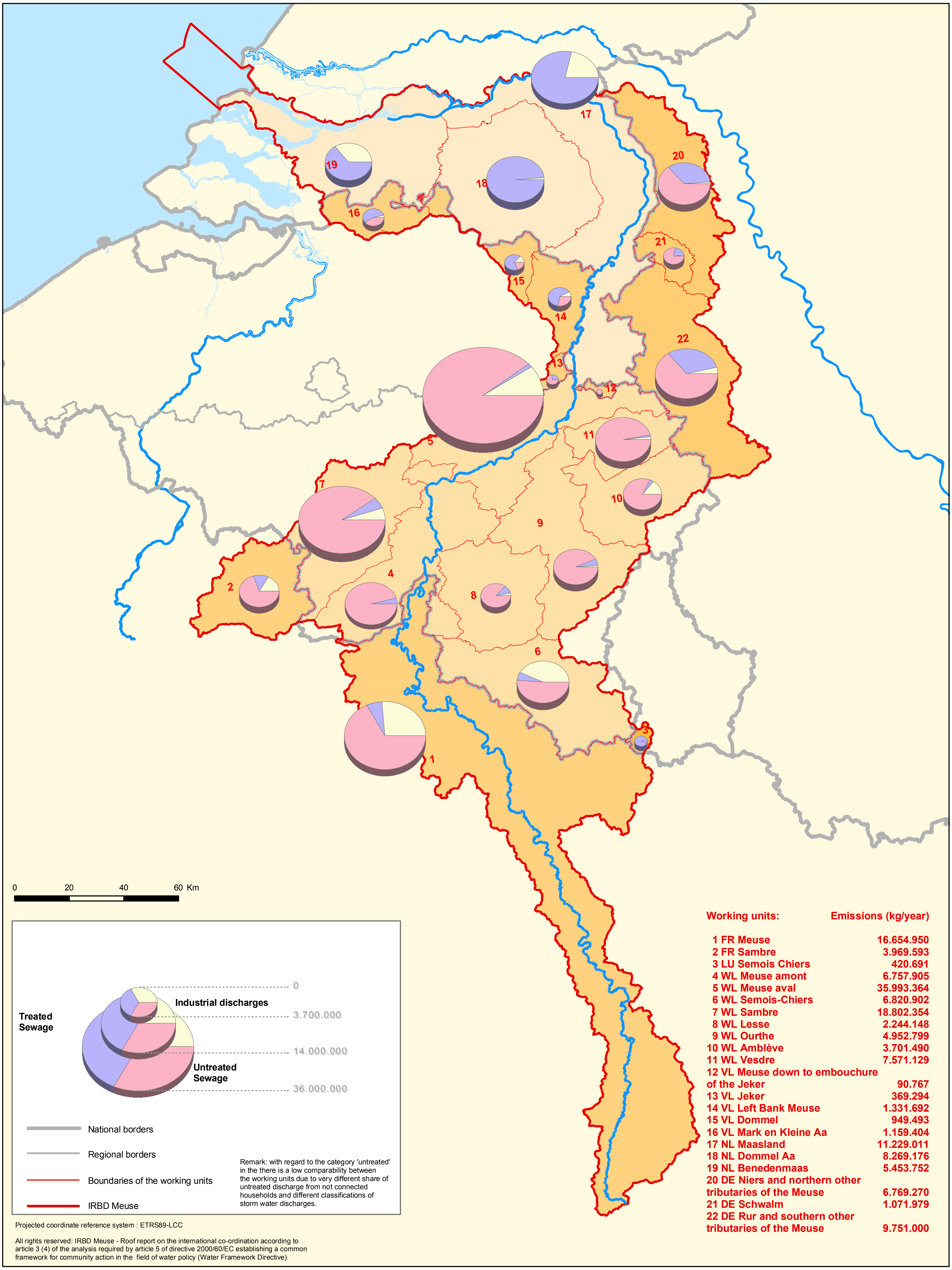
Working units	Industrial discharges	Treated sewage	Untreated sewage
1 FR Meuse	4 385 475	1 182 600	11 086 875
2 FR Sambre	651 316	551 961	2 766 316
3 LU	0	394 995	25 696
4 WL Meuse upper course	14 111	249 204	6 494 590
5 WL Meuse lower course	3 195 557	272 249	32 525 558
6 WL Semois-Chiers	2 958 809	371 139	3 490 954
7 WL Sambre	899 165	901 977	17 001 212
8 WL Lesse	59 626	229 962	1 954 560
9 WL Ourthe	66 623	242 744	4 643 432
10 WL Amblève	519 051	122 992	3 059 447
11 WL Vesdre	124 909	95 551	7 350 669
12 VL Meuse up to the mouth of the Jeker	0	0	90 767
13 VL Jeker	0	100 733	268 562
14 VL Left Bank of Meuse	111 367	856 691	363 635
15 VL Dommel	126 685	646 026	176 782
16 VL Mark and Kleine Aa	38 689	642 451	478 264
17 NL Maasland	2 368 865	8 860 146	0
18 NL Dommel Aa	66 844	8 202 332	0
19 NL Benedenmaas	1 970 474	3 483 279	0
20 DE Niers and various northern tributaries of the Meuse	18 270	2 443 000	4 308 000
21 DE Schwalm	2 979	229 000	840 000
22 DE Rur and various southern tributaries of the Meuse	356 000	3 176 000	6 219 000
Tot IRBD Meuse (kg/year)	**17 934 814**	**33 255 031**	**103 144 319**

% IRBD Meuse	**11,41**	**21,16**	**65,62**

Remark : The comparability of the data between the parties is low due to very different share of untreated discharge connected household and different classifications of storm water discharges

Annex 16

IRBD Meuse - Chemical Oxygen Demand per working unit



Annex 17

Status of the waters bodies per working unit

(*) including canals for FR+WL+VL
(**) including canals for NL

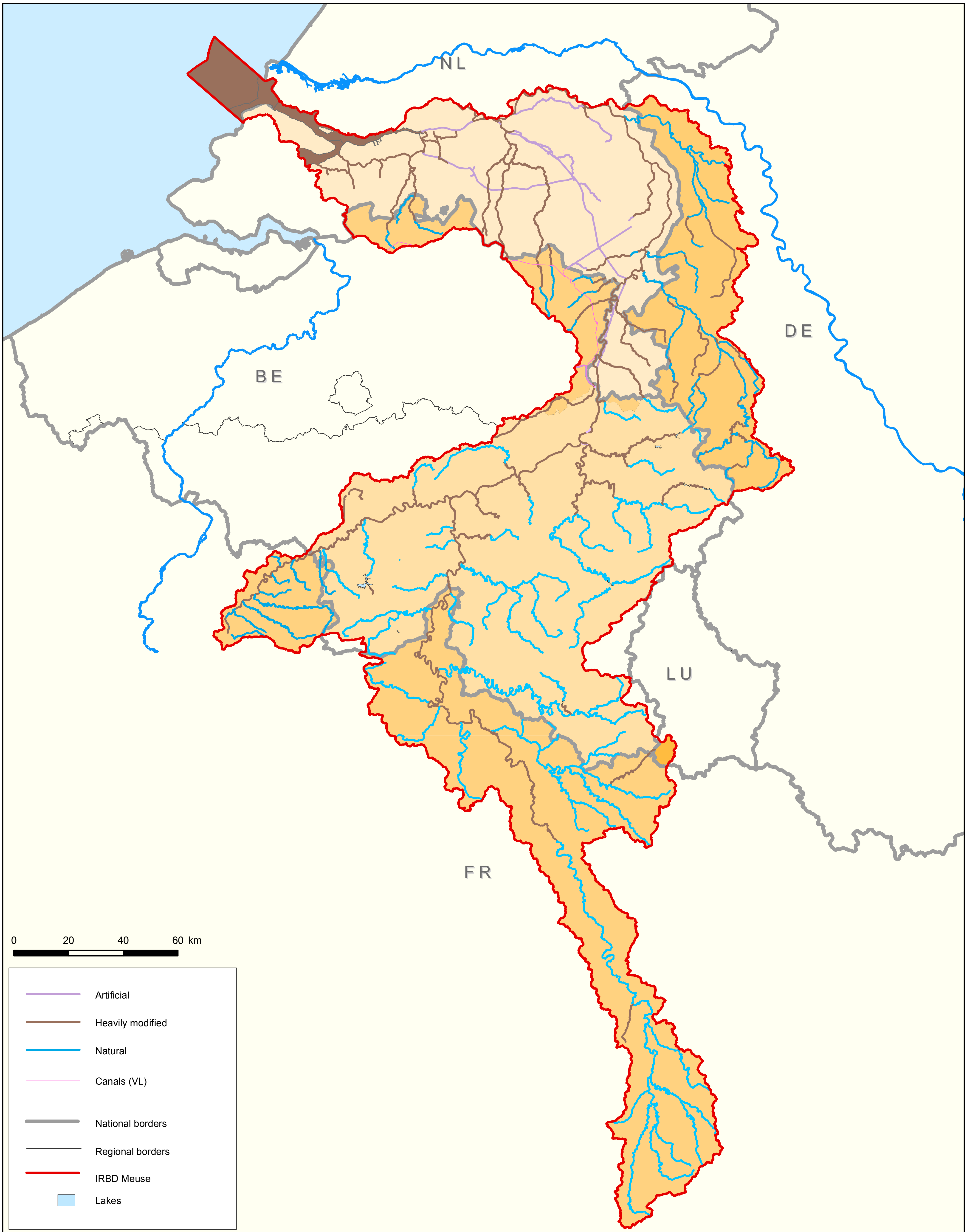
		Working units	Status	Rivers (*)	Lakes (**)	Transitional waters	Coastal waters
1	FR	Meuse	Natural	125	0	0	0
			Heavily modified	8	4	0	0
			Artificial	6	1	0	0
2	FR	Sambre	Natural	9	0	0	0
			Heavily modified	1	0	0	0
			Artificial	0	0	0	0
3	LU	Semois-Chiers	Natural	0	0	0	0
			Heavily modified	1	0	0	0
			Artificial	0	0	0	0
4	WL	Meuse upper course	Natural	31	0	0	0
			Heavily modified	6	0	0	0
			Artificial	0	1	0	0
5	WL	Meuse lower course	Natural	24	0	0	0
			Heavily modified	11	0	0	0
			Artificial	1	0	0	0
6	WL	Semois-Chiers	Natural	38	0	0	0
			Heavily modified	3	0	0	0
			Artificial	0	1	0	0
7	WL	Sambre	Natural	15	0	0	0
			Heavily modified	10	0	0	0
			Artificial	2	5	0	0
8	WL	Lesse	Natural	29	0	0	0
			Heavily modified	0	0	0	0
			Artificial	0	0	0	0
9	WL	Ourthe	Natural	31	0	0	0
			Heavily modified	2	0	0	0
			Artificial	1	1	0	0
10	WL	Amblève	Natural	13	0	0	0
			Heavily modified	4	0	0	0
			Artificial	0	2	0	0
11	WL	Vesdre	Natural	8	0	0	0
			Heavily modified	13	0	0	0
			Artificial	1	2	0	0
12	VL	Meuse up to the mouth of the Jeker	Natural	3	0	0	0
			Heavily modified	1	0	0	0
			Artificial	0	0	0	0
13	VL	Jeker	Natural	0	0	0	0
			Heavily modified	6	0	0	0
			Artificial	0	0	0	0
14	VL	Left bank of Meuse	Natural	7	0	0	0
			Heavily modified	18	0	0	0
			Artificial	6	4	0	0
15	VL	Dommel	Natural	4	0	0	0
			Heavily modified	4	0	0	0
			Artificial	1	1	0	0
16	VL	Mark and Kleine Aa	Natural	6	0	0	0
			Heavily modified	3	0	0	0
			Artificial	0	0	0	0
17	NL	Maasland	Natural	12	4	0	0
			Heavily modified	77	15	0	0
			Artificial	15	32	0	0
18	NL	Dommel Aa	Natural	0	13	0	0
			Heavily modified	58	7	0	0
			Artificial	12	22	0	0
19	NL	Benedenmaas	Natural	0	1	0	0
			Heavily modified	13	15	0	0
			Artificial	1	18	0	0
19*	NL	North Sea	Natural	0	0	0	0
			Heavily modified	0	0	0	2
			Artificial	0	0	0	0
20	DE	Niers and various nothern tributaries	Natural	43	0	0	0
			Heavily modified	16	0	0	0
			Artificial	1	0	0	0
21	DE	Schwalm	Natural	11	0	0	0
			Heavily modified	3	0	0	0
			Artificial	0	0	0	0
22	DE	Rur and various southern tributaries of the Meuse	Natural	76	0	0	0
			Heavily modified	43	0	0	0
			Artificial	5	1	0	0

	Status	Rivers (*)	Lakes (**)	Transitional waters	Coastal waters
FR	Natural	134	0	0	0
	Heavily modified	9	4	0	0
	Artificial	6	1	0	0
LU	Natural	0	0	0	0
	Heavily modified	1	0	0	0
	Artificial	0	0	0	0
WL	Natural	189	0	0	0
	Heavily modified	49	0	0	0
	Artificial	5	12	0	0
VL	Natural	20	0	0	0
	Heavily modified	32	0	0	0
	Artificial	7	5	0	0
NL	Natural	12	18	0	0
	Heavily modified	148	37	0	2
	Artificial	28	72	0	0
DE	Natural	130	0	0	0
	Heavily modified	62	0	0	0
	Artificial	6	1	0	0

	Status	Rivers (*)	Lakes (**)	Transitional waters	Coastal waters
IRBD	Natural	485	18	0	0
	Heavily modified	301	41	0	2
	Artificial	52	91	0	0

Annex 18

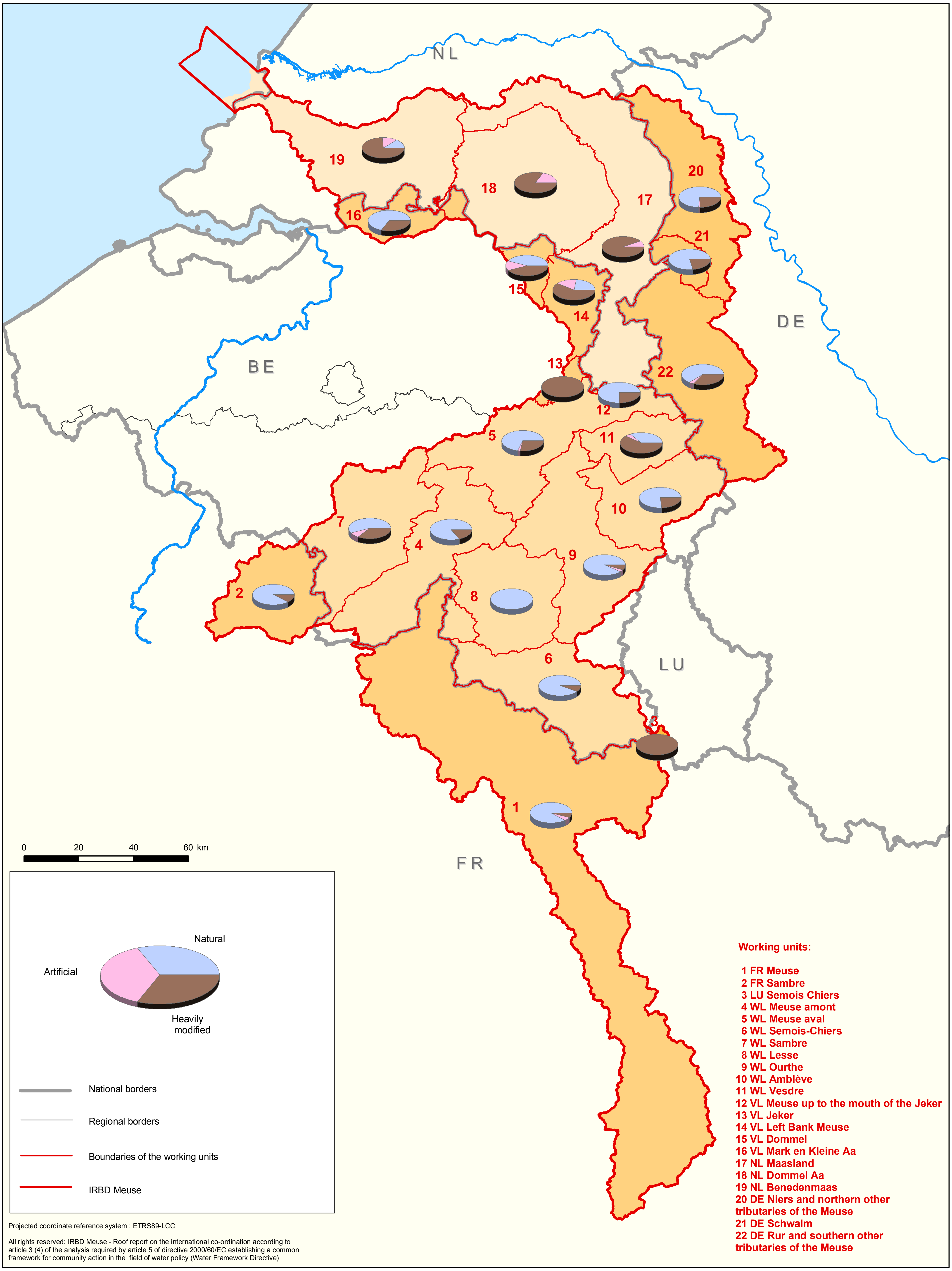
IRBD Meuse - Status of surface waters (rivers)



Projected coordinate reference system : ETRS89-LCC

Annex 19

IRBD Meuse - Status of surface waters (rivers)
Distribution per working unit



Annex 20

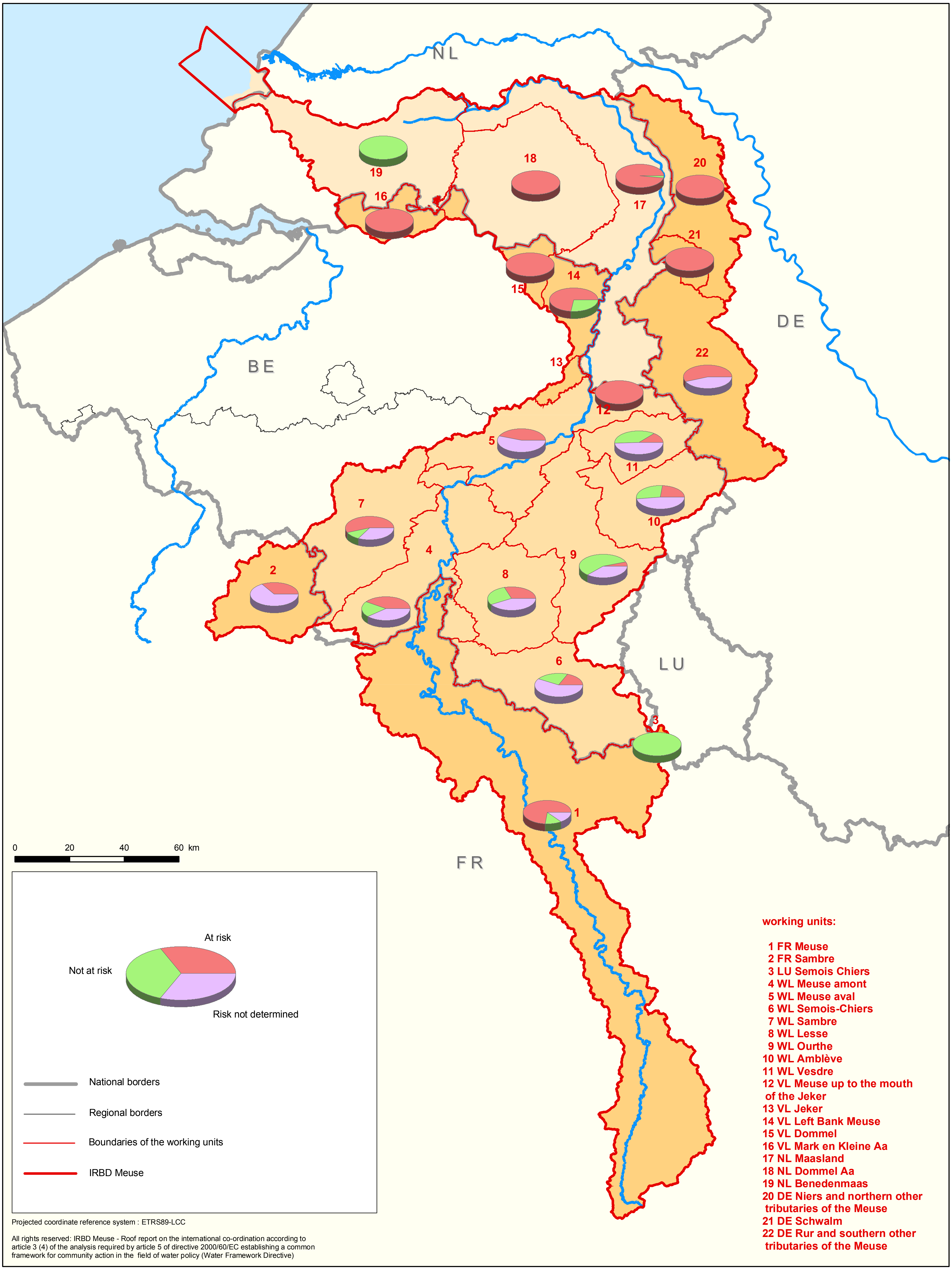
Water bodies : Risk of failing to meet good status per working unit

Working units			Surface waters except coastal waters	Water bodies (Basin > 10 km²)		Water bopdies at risk		Quality components responsible for categorization WB at risk										Not at risk		Not assessed risk or no sufficent data for assessment	
								Biological component		Chemical-Physical component		Hydromorphological component		Specific substances component		Substances Annex IX and X from WFD					
				Number	Lenght (km)	Number	Lenght	Number	Lenght	Number	Lenght	Number	Lenght	Number	Lenght	Number	Lenght	Number	Lenght	Number	Lenght
1	FR	Meuse	Natural WB	125	2503	58	1831	22	1138	25	897	22	679	30	967	(*)	(*)	31	360	36	311
			Heavily modified WB	8	361	Not assessed														8	361
			Artificial WB	6	138	Not assessed														6	138
2	FR	Sambre	Natural WB	9	226	3	82	0	0	3	82	Not assessed						0	0	6	144
			Heavily modified WB	1	70	Not assessed														1	70
			Artificial WB	0	0																
3	LU	Semois-Chiers	Natural WB	2	5,99	0	0	0	0	0	0	0	0	0	0	0	0	2	5,99	0	0
			Heavily modified WB	1	9,34	1	9,34	1	9,34	1	9,34	1	9,34	1	9,34	1	9,34	0	0	0	0
			Artificial WB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	WL	Meuse upper course	Natural WB	31	614,2038	8	262,9755	8	262,9755	6	210,8821	0	0	0	0			3	98,50514	20	252,7232
			Heavily modified WB	6	160,3965	Not assessed														6	
			Artificial WB	1		Not assessed														1	
5	WL	Meuse lower course	Natural WB	24	487,2736	6	221,9828	6	221,9828	6	221,9828	0	0	1	45,5			0	0	18	265,2908
			Heavily modified WB	11	274,3967	Not assessed														11	
			Artificial WB	1	24,54122	Not assessed														1	
6	WL	Semois-Chiers	Natural WB	38	797,7522	3	133,7796	3	133,7796	3	133,7796	0	0	1	27,99784	1	27,99	5	210,9117	30	453,061
			Heavily modified WB	3	30,24906	Not assessed														3	
			Artificial WB	1		Not assessed														1	
7	WL	Sambre	Natural WB	15	402,7446	7	219,4359	7	219,4359	7	219,4359	0	0					1	41,44462	7	141,8641
			Heavily modified WB	10	213,7016	Not assessed														10	
			Artificial WB	7	47,54269	Not assessed														7	
8	WL	Lesse	Natural WB	29	554,8879	7	177,1395	4	100,3442	6	154,8492	0	0	1	47,42797			6	136,9736	16	240,7747
			Heavily modified WB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Artificial WB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	WL	Ourthe	Natural WB	31	644,4474	1	27,84485	1	27,84485	0	0	0	0	0	0			12	364,4514	18	252,1512
			Heavily modified WB	2	73,55684	Not assessed														2	
			Artificial WB	2	2,717112	Not assessed														2	
10	WL	Amblève	Natural WB	13	285,0099	3	65,62869	3	65,62869	3	65,62869	0	0	1	43,45766			3	80,96651	7	138,4147
			Heavily modified WB	4	55,29748	Not assessed														4	
			Artificial WB	2		Not assessed														2	
11	WL	Vesdre	Natural WB	8	121,4796	1	13,93641	1	13,93641	1	13,93641	0	0					2	47,73384	5	59,80939
			Heavily modified WB	13	140,3078	Not assessed														13	
			Artificial WB	3	3,612653	Not assessed														3	
12	VL	Meuse up to the mouth of the Jeker	Natural WB	3	13,751	3	13,751					1	3,226683					0		0	
			Heavily modified WB	1	4,872	1	4,871	1	4,872	1	4,872	1	4,87191					0		0	
			Artificial WB	0									0					0		0	
13	VL	Jeker	Natural WB	0									0					0		0	
			Heavily modified WB	6	39,569	6	39,56905	6	39,56905	6	39,56905	6	39,56905			6	39,56905	0		0	
			Artificial WB	0					0		0		0				0	0		0	
14	VL	Left bank of Meuse	Natural WB	7	68,087	5	49,172	3	9,326288	2	5,128653	7	68,087	2	22,94491	4	28,50883	2	18,915	0	
			Heavily modified WB	18	174,22	15	144,349	14	139,4474	11	73,16916	18	174,22		0	13	92,018	2	28,285	1	1,586
			Artificial WB	6	67,923	6	67,923	6	67,92321	6	67,92321	6	67,923	4	61,35021	6	67,92321	0		0	
15	VL	Dommel	Natural WB	4	38,052	4	38,052	3	30,18895	1	5,623845	4	38,05247		0	4	38,05247	0		0	
			Heavily modified WB	4	49,089	4	49,098	4	49,098	3	37,5183	4	49,098	2	10,0826	3	37,5183	0		0	
			Artificial WB	1	23,608	1	23,608	1	23,60821	1	23,60821	1	23,60821	1	23,60821	1	23,60821	0		0	
16	VL	Mark et Kleine Aa	Natural WB	6	64,539	6	64,539	7	42,853	6	64,509	5	61,0289	1	21,655	6	64,539	0		0	
			Heavily modified WB	3	60,215	3	60,215	2	47,947	2	47,947	2	29,657	1	30,588	2	29,657	0		0	
			Artificial WB	0		0												0		0	
17	NL	Maasland	Natural WB	18	120	16	100	9	56	12	77			9	72	8	62	2	2,2	0	0
			Heavily modified WB	93	1122	93	1122	88	1104	77	1082			63	919	59	897	0	0	0	0
			Artificial WB	44	728	44	728	41	705	38	697			32	628	33	638	0	0	0	0
18	NL	Dommel Aa	Natural WB	13	116	13	116	9	55	0	0			0	0	0	0	0	0	0	0
			Heavily modified WB	69	944	69	944	65	911	46	671			43	667	8	107	0	0	0	0
			Artificial WB	30	567	30	567	25	529	21	492			19	434	13	392	0	0	0	0
19	NL	Benedenmaas	Natural WB	1	9,4	0	0	0	0	0	0			0	0	0	0	1	9,4	0	0
			Heavily modified WB	28	1032	28	1032	28	1032	27	1022			20	999	25	1020	0	0	0	0
			Artificial WB	19	976	19	976	19	976	16	958			10	833	9	702	0	0	0	0
20	DE	Niers and various nothern tributaries of the Meuse	Natural WB	43	397,8	43	397,8	35	340,6	27	262,1	41	379,4	18	168,7	6	83,1	0	0	0	0
			Heavily modified WB	16	112,5	16	112,5	15	102,5	6	39	12	93,8	10	59,3	8	45,3	0	0	0	0
			Artificial WB	1	9,7	1	9,7	1	9,7	1	9,7	1	9,7	0	0	1	9,7	0	0	0	0
21	DE	Schwalm	Natural WB	11	52,8	11	52,8	8	40,5	11	52,8	7	25,6	9	37,8	0	0	0	0	0	0
			Heavily modified WB	3	17,3	3	17,3	3	17,3	3	17,3	3	17,3	2	11	0	0	0	0	0	0
			Artificial WB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	DE	Rur and various southern tributaries of the Meuse	Natural WB	76	581,8	42	319	26	258,5	16	114,3	17	138,7	19	151,1	13	122,2	0	0	34	263,9
			Heavily modified WB	43	243,8	43	243,8	27	181,9	17	104,9	41	237	12	83	7	52,6	0	0	0	0
			Artificial WB	6	55,2	6	55,2	0	0	0	0	3	41,6	2	13,5	1	12,4	0	0	0	0

NB Flander: During the designation of the Heavily modified bodies in Flander, some of them does not have been considered and for other, no decision have been taken for their status. The figure in the table have to be considered as a first global assessment but have still to be further analysed

Annex 21

IRBD Meuse - Natural surface waters.
Risk of failing to meet the good status per working unit



Annex 22

Groundwater data in the IRBD Meuse

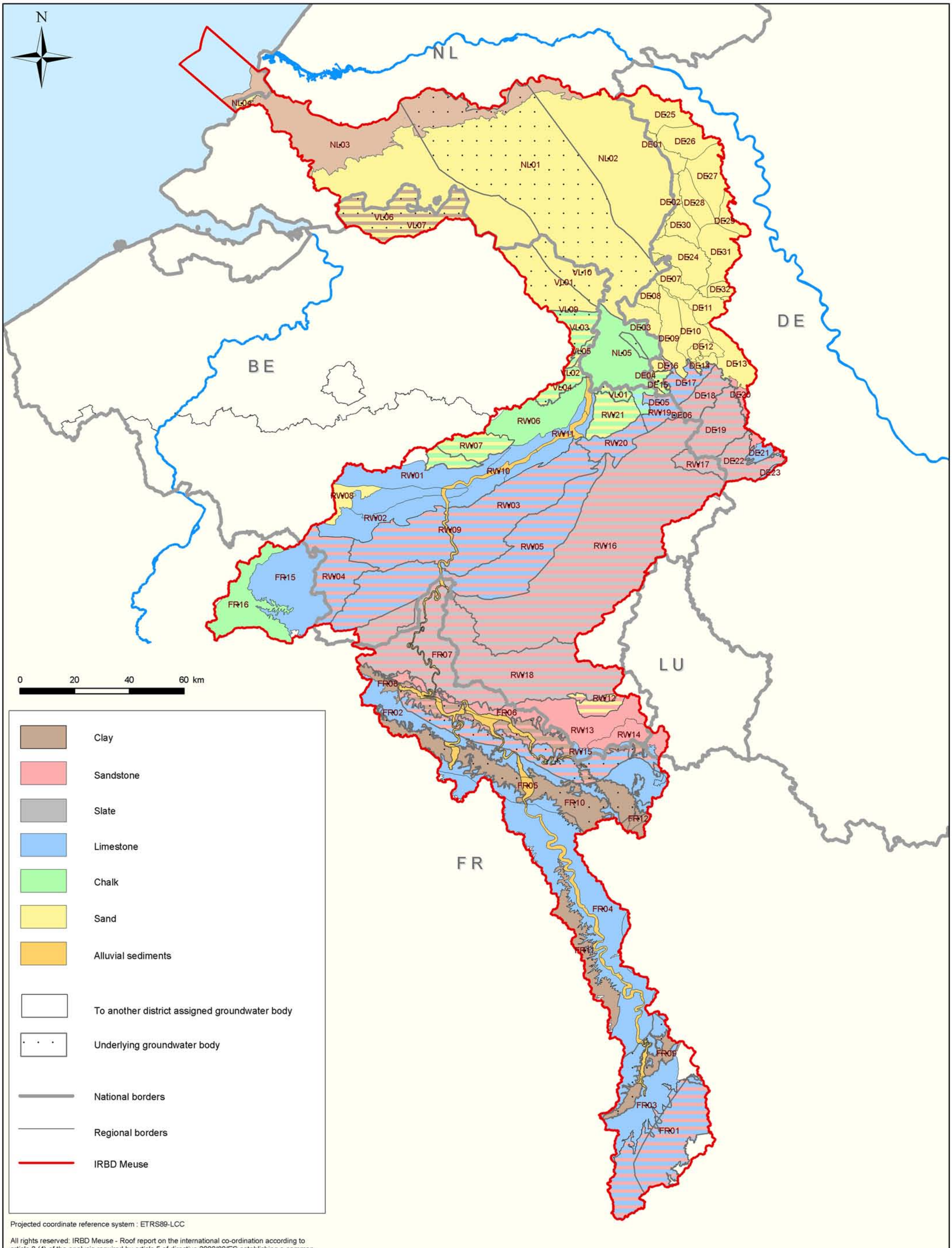
			Units	France	Luxembourg	Wallonia	Flanders	The Netherlands	Germany	TOTAL
General informations										
Area of GWB by State/Region (cumulated if overlay)			km²	10 833	169	12 435	3 503	12 247	3 987	43 174
Ratio of GWB area (by state/region) from total GWB area			%	25,1	0,4	28,8	8,1	28,4	9,2	100,0
Number of GWB			item	12	2	21	10	5	32	82
Mean area of GWB			km²	903	85	592	350	2449	125	527
Trans-border information										
		Trans-border aquifers	area (km²)	2 889	169	6 209	3 503	10 797	3 862	27 429
			% from GWB area by State/Re	26,7	100,0	49,9	100,0	88,2	96,9	63,5
			% from total GWB area	6,7	0,4	14,4	8,1	25,0	8,9	63,5
Risk analysis										
	GWB at risk									
		yes	area (km²)	6 727	0	6 012	2 756	9 079	3 092	27 666
			% from GWB area by State/Re	62,1	0,0	48,3	78,7	74,1	77,6	64,1
			% from total GWB area	15,6	0,0	13,9	6,4	21,0	7,2	64,1
		no	area (km²)	3 544	169	5 263	747	3 168	895	13 786
			% from GWB area by State/Re	32,7	100,0	42,3	21,3	25,9	22,4	31,9
			% from total GWB area	8,2	0,4	12,2	1,7	7,3	2,1	31,9
		not determined	area (km²)	562	0	1 160	0	0	0	1 722
			% from GWB area by State/Re	5,2	0,0	9,3	0,0	0,0	0,0	4,0
			% from total GWB area	1,3	0,0	2,7	0,0	0,0	0,0	4,0
	Quantitative risk and pressures									
	GWB at quantitative risk									
		yes	area (km²)	876	0	0	718	0	1 177	2 771
			% from GWB area by State/Re	8,1	0,0	0,0	20,5	0,0	29,5	6,4
			% from total GWB area	2,0	0,0	0,0	1,7	0,0	2,7	6,4
		no	area (km²)	9 957	169	10 290	2 785	12 247	2 810	38 258
			% from GWB area by State/Re	91,9	100,0	82,8	79,5	100,0	70,5	88,6
			% from total GWB area	23,1	0,4	23,8	6,5	28,4	6,5	88,6
		not determined	area (km²)	0	0	2 145	0	0	0	2 145
			% from GWB area by State/Re	0,0	0,0	17,2	0,0	0,0	0,0	5,0
			% from total GWB area	0,0	0,0	5,0	0,0	0,0	0,0	5,0
	Quantitative risk type									
		Water table negative trend								
		yes	area (km²)	876	0	0	552	0	1 177	2 605
			% from GWB area by State/Re	8,1	0,0	0,0	15,8	0,0	29,5	6,0
			% from total GWB area	2,0	0,0	0,0	1,3	0,0	2,7	6,0
		no	area (km²)	7 734	0	12 435	2 785	9 079	2 810	34 843
			% from GWB area by State/Re	71,4	0,0	100,0	79,5	74,1	70,5	80,7
			% from total GWB area	17,9	0,0	28,8	6,5	21,0	6,5	80,7
		not determined	area (km²)	2 223	169	0	166	3 168	0	5 726
			% from GWB area by State/Re	20,5	100,0	0,0	4,7	25,9	0,0	13,3
			% from total GWB area	5,1	0,4	0,0	0,4	7,3	0,0	13,3
		Water budget negative trend								
		yes	area (km²)	0	0	0	0	0	1 177	1 177
			% from GWB area by State/Re	0,0	0,0	0,0	0,0	0,0	29,5	2,7
			% from total GWB area	0,0	0,0	0,0	0,0	0,0	2,7	2,7
		no	area (km²)	7 734	169	12 435	0	9 079	2 810	32 227
			% from GWB area by State/Re	71,4	100,0	100,0	0,0	74,1	70,5	74,6
			% from total GWB area	17,9	0,4	28,8	0,0	21,0	6,5	74,6
		not determined	area (km²)	3 099	0	0	3 503	3 168	0	9 770
			% from GWB area by State/Re	28,6	0,0	0,0	100,0	25,9	0,0	22,6
			% from total GWB area	7,2	0,0	0,0	8,1	7,3	0,0	22,6
	Quantitative pressure type									
		Abstraction								
		yes	area (km²)	10 833	169	12 435	3 452	7 023	3 969	37 881
			% from GWB area by State/Re	100,0	100,0	100,0	98,5	57,3	99,5	87,7
			% from total GWB area	25,1	0,4	28,8	8,0	16,3	9,2	87,7
		no	area (km²)	0	0	0	51	1 423	18	1 492
			% from GWB area by State/Re	0,0	0,0	0,0	1,5	11,6	0,5	3,5
			% from total GWB area	0,0	0,0	0,0	0,1	3,3	0,0	3,5
		not determined	area (km²)	0	0	0	0	3 801	0	3 801
			% from GWB area by State/Re	0,0	0,0	0,0	0,0	31,0	0,0	8,8
			% from total GWB area	0,0	0,0	0,0	0,0	8,8	0,0	8,8
		Artificial recharge								
		yes	area (km²)	1 366	0	0	0	27	890	2 283
			% from GWB area by State/Re	12,6	0,0	0,0	0,0	0,2	22,3	5,3
			% from total GWB area	3,2	0,0	0,0	0,0	0,1	2,1	5,3
		no	area (km²)	9 467	169	12 435	3 503	9 052	3 097	37 723
			% from GWB area by State/Re	87,4	100,0	100,0	100,0	73,9	77,7	87,4
			% from total GWB area	21,9	0,4	28,8	8,1	21,0	7,2	87,4
		not determined	area (km²)	0	0	0	0	3 168	0	3 168
			% from GWB area by State/Re	0,0	0,0	0,0	0,0	25,9	0,0	7,3
			% from total GWB area	0,0	0,0	0,0	0,0	7,3	0,0	7,3

			Units	France	Luxembourg	Wallonia	Flanders	The Netherlands	Germany	TOTAL
	Qualitative risk and pressures									
	GWB at qualitative risk									
		yes	area (km²)	6 727	0	6 012	2 310	9 079	3 092	27 220
			% from GWB area by State/Re	62,1	0,0	48,3	65,9	74,1	77,6	63,0
			% from total GWB area	15,6	0,0	13,9	5,4	21,0	7,2	63,0
		no	area (km²)	3 544	169	5 263	1 193	3 168	895	14 232
			% from GWB area by State/Re	32,7	100,0	42,3	34,1	25,9	22,4	33,0
			% from total GWB area	8,2	0,4	12,2	2,8	7,3	2,1	33,0
		not determined	area (km²)	562	0	1 160	0	0	0	1 722
			% from GWB area by State/Re	5,2	0,0	9,3	0,0	0,0	0,0	4,0
			% from total GWB area	1,3	0,0	2,7	0,0	0,0	0,0	4,0
	GWB at observed qualitative risk									
		yes	area (km²)	6 727	0	2 782	2 142	8 446	3 092	23 189
			% from national GWB area	62,1	0,0	22,4	61,1	69,0	77,6	53,7
			% from total GWB area	15,6	0,0	6,4	5,0	19,6	7,2	53,7
		no	area (km²)	4 106	169	9 653	1 361	3 801	895	19 985
			% from national GWB area	37,9	100,0	77,6	38,9	31,0	22,4	46,3
			% from total GWB area	9,5	0,4	22,4	3,2	8,8	2,1	46,3
	GWB at expected qualitative risk									
		yes	area (km²)	2 919	0	3 230	1 751	6 996	3 724	18 620
			% from GWB area by State/Re	26,9	0,0	26,0	50,0	57,1	93,4	43,1
			% from total GWB area	6,8	0,0	7,5	4,1	16,2	8,6	43,1
		no	area (km²)	7 917	169	9 205	1 751	5 251	263	24 556
			% from GWB area by State/Re	73,1	100,0	74,0	50,0	42,9	6,6	56,9
			% from total GWB area	18,3	0,4	21,3	4,1	12,2	0,6	56,9
	Qualitative pressure type									
		Diffuse sources of pollution								
		yes	area (km²)	9 917	0	3 484	1 752	8 419	2 781	26 353
			% from national GWB area	91,5	0,0	28,0	50,0	68,7	69,8	61,0
			% from total GWB area	23,0	0,0	8,1	4,1	19,5	6,4	61,0
		no	area (km²)	916	169	8 765	0	27	1 206	11 083
			% from national GWB area	8,5	100,0	70,5	0,0	0,2	30,2	25,7
			% from total GWB area	2,1	0,4	20,3	0,0	0,1	2,8	25,7
		not determined	area (km²)	0	0	186	1 751	3 801	0	5 738
			% from national GWB area	0,0	0,0	1,5	50,0	31,0	0,0	13,3
			% from total GWB area	0,0	0,0	0,4	4,1	8,8	0,0	13,3
		Point sources of pollution								
		yes	area (km²)	2 139	0	5 891	1 435	6 996	942	17 403
			% from GWB area by State/Re	19,7	0,0	47,4	41,0	57,1	23,6	40,3
			% from total GWB area	5,0	0,0	13,6	3,3	16,2	2,2	40,3
		no	area (km²)	4 502	169	6 544	0	1 450	3 045	15 710
			% from GWB area by State/Re	41,6	100,0	52,6	0,0	11,8	76,4	36,4
			% from total GWB area	10,4	0,4	15,2	0,0	3,4	7,1	36,4
		not determined	area (km²)	4 192	0	0	2 068	3 801	0	10 061
			% from GWB area by State/Re	38,7	0,0	0,0	59,0	31,0	0,0	23,3
			% from total GWB area	9,7	0,0	0,0	4,8	8,8	0,0	23,3

Important note : the data and statistics in this document only take into account 5 GWB for NL : NLGW_NB00055, NLGW0006, NLGW0013, NLGW0017, NLGW0019

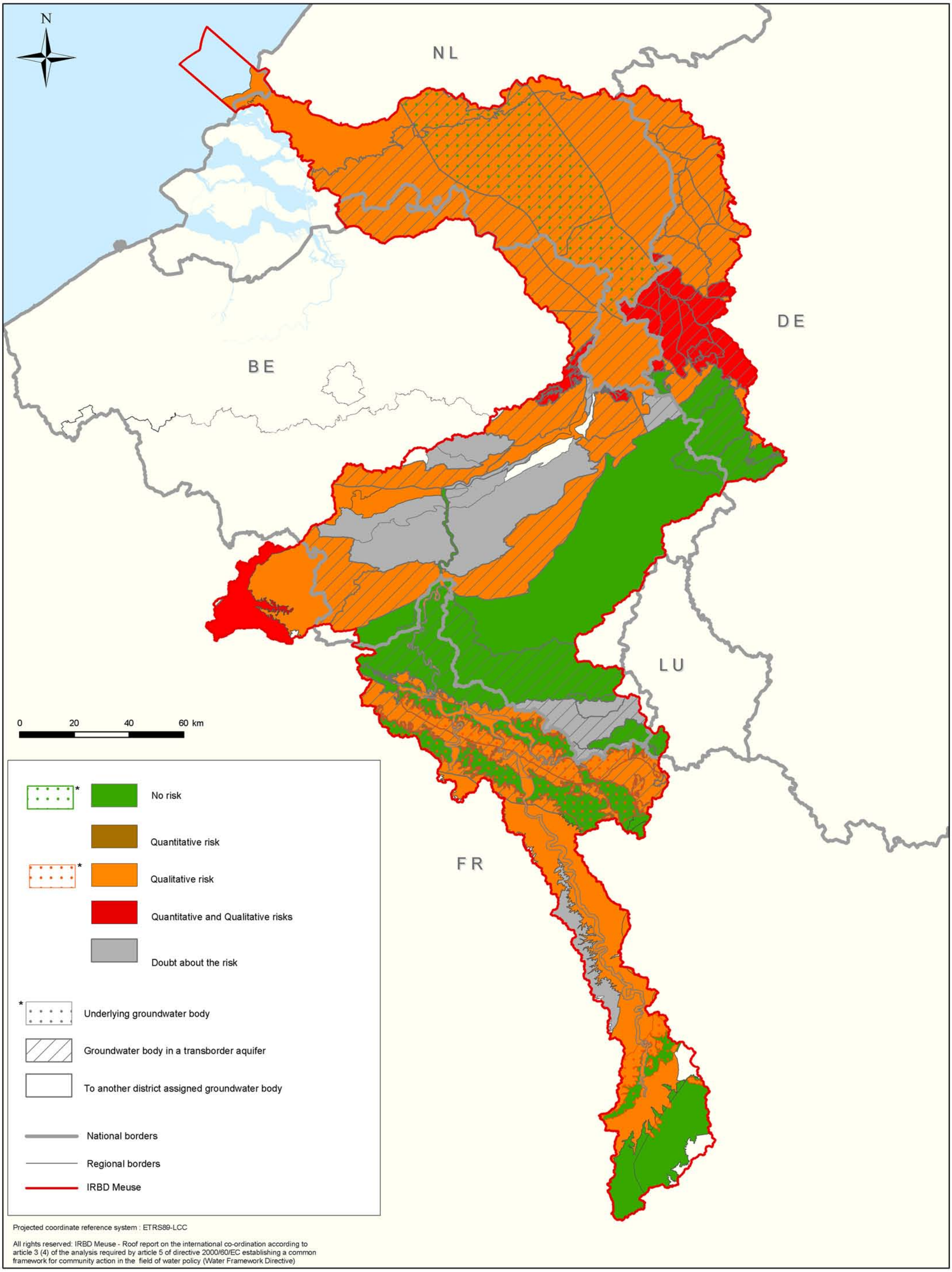
Annex 23

IRBD Meuse : Groundwater bodies



Projected coordinate reference system : ETRS89-LCC

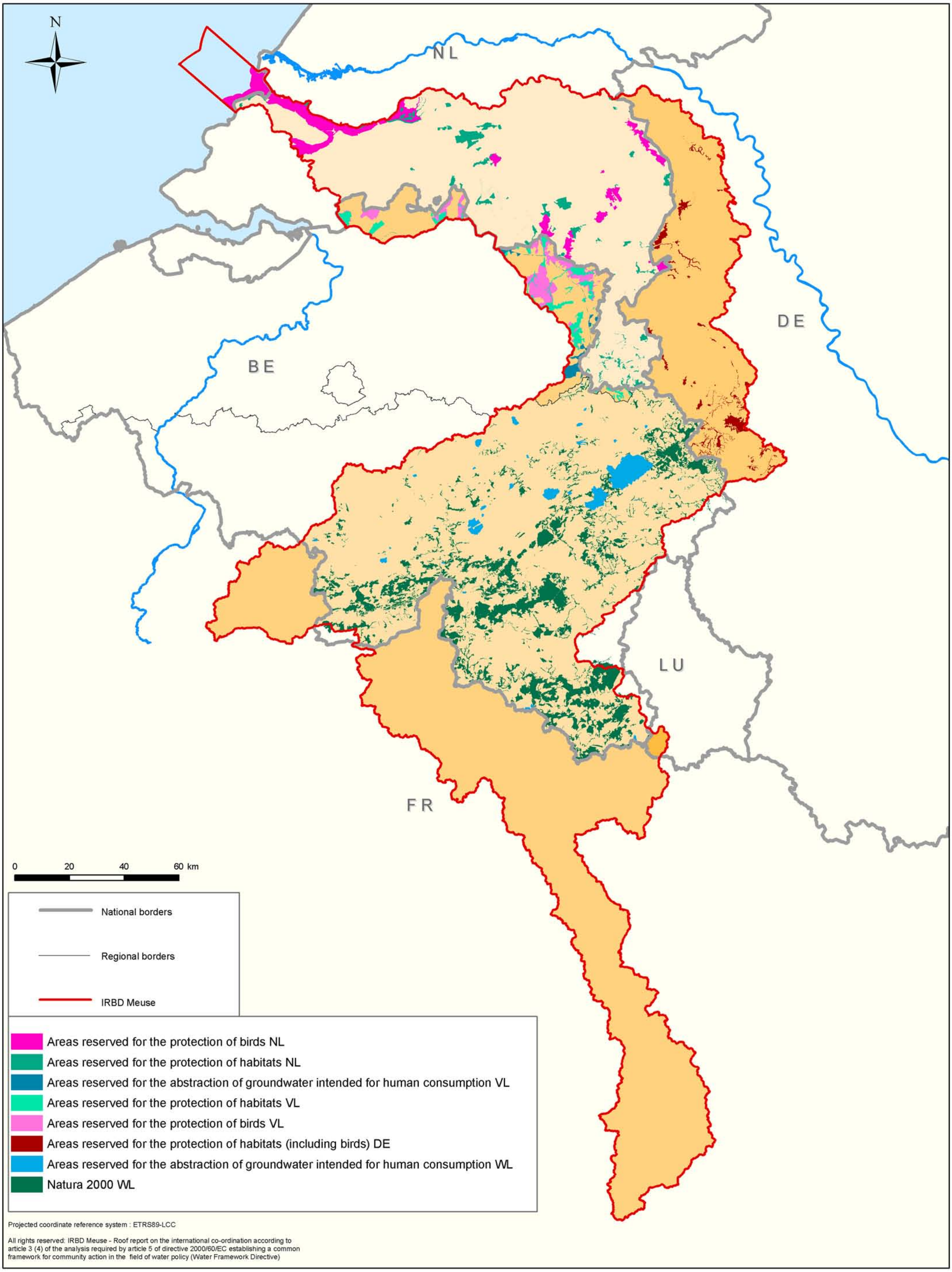
IRBD Meuse - Groundwater bodies: Risk of failing to meet the good status



Projected coordinate reference system : ETRS89-LCC

Annex 25

IRBD Meuse - Specially protected areas



Annex 26

Estimates for the cost recovery rates (including definitions, data and methods used for the calculation)

	Item	France	Luxemburg	Wallonia	Flanders	The Netherlands	Germany
Définitions	Water services	Production of drinking water Wastewater treatment (including sewerage)	Production of drinking water Wastewater treatment (including sewerage)	Production of drinking water Wastewater treatment (including sewerage) Except own water production	Production and distribution of drinking water Wastewater collection and treatment (including sewerage)	Production of water Sewerage Wastewater treatment Quantitative groundwater management Regional water management	Production of drinking water Wastewater treatment (including sewerage)
	Selfservices				Included: drinking water and watewater treatment	Included	
	Environmental costs	Not in the 2005 report	Not in the 2005 report	Not in the 2005 report	Partly estimated and included in drinking water production	Estimated using prevention cost method	Not in the 2005 report
Data	Data sources used	Publicly available data	Benchmark study	Publicly available data	Publicly available data	Publicly available data	Publicly available data
Methods	Level of detail (according to Wateco guidance note)	Applied		Applied	Not fully applied	Not fully applied	Not fully applied
	Results by user group (agriculture, households, industry)	Yes	No	Yes, except for agriculture	No	No	No
	Results by basin	Yes		Yes	No	No	Yes
Results	Cost recovery rates	59 - 89		Production of water 84% Waste water treatments: 31%	100% (drinking water)	80 – 100%	88 – 118 % (drinking water) 94 – 126 % (waste water)