EEA/NSV/10/002 – ETC/ICM

European Topic Centre
Inland, coastal, marine waters

EEA Water 2012 Report
Thematic assessment on Ecological status and pressures

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Version history

Version	Date	Author	Status and description	Distribution
0.1	15/11/2011		Pre-draft for ETC	To: Peter and Trine
1.0	22/11/2011		Zero draft	To: Advisory group
2.0	DD/MM/YYYY		Final draft for EEA	
3.0	DD/MM/YYYY		Final version for EEA	

Contents

Abbreviations

<to be completed>
AWB – Artificial water body
EEA – European Environmental Agency
ETC / ICM – European Topic Centre on Inland Coastal and Marine Waters
EU – European Union
GEP – Good ecological potential
HMWB – Heavily modified water body
MS – Member States
WFD – Watre Framework Directive
WFD-CIS – Water Framework Directives Common Implementation Strategy

0. Guidance to the reader

The current zero draft of the thematic assessment on ecological status, pressures and impacts aims at providing an indication of the information and results going into the final draft. It is EEA plans to have this first draft well developed over the coming three month and put the chapter for country/member states and country consultation (February/March).

The current draft starts by chapters presenting information on the WFD and the current status of reported data and information by Member States in relation to River basin management plans. Chapter 4 and 5 present a summary on information on River Basin Districts (RBDs) and water bodies (WBs). In these chapters a presentation of some of the methodology issues is included. This will be further developed in the coming version and will probably be placed into annexes.

Chapters 8 to 11 present results, information and assessment on status, pressures and impacts of European waters. The results are a compilation of results based on the data reported by Member States with their RBMPs and stored in the WISE-WFD database. All chapters present results for the four water categories: rivers, lakes, transitional and coastal waters.

- Chapter 8 presents European results
- Chapter 9 presents regional results
- Chapter 10 has some preliminary results of the status of different water types on status, pressures and impacts. This chapter will be further developed when there are a better data set on common typologies.
- Chapter 11 presents country comparisons on status, pressures and impacts.

In the next version it is the intention to add some chapters on linking the results on status, pressures and impacts to water quality (data reported to EEA by countries via WISE-SOE); to more information on the main sectors such as urban wastewater treatment, agriculture etc.

The first draft (Febriary 2012 version) will include request for case studies supporting the assessments and other relevant information. We hope that Member States and relevant stakeholders will contribute with case studies, text boxes expressing their views on the aspects raised in the respective chapters. Contributions will be asked for during the consultation period during February/March.

Comments and suggestions to the current zero draft are very much appreciated. Thanks in advance.

1. Introduction – setting the scene

Placeholder for text to be included
To maintain and improve the essential functions of our water ecosystems, we need to manage them well. This can only succeed if we adopt the integrated approach introduced in the WFD and other water policies. Many European water bodies are at risk of failing to meet the aim of the WFD of achieving good status by 2015, due to problems in the management of water quality, water quantity, modifications of the structure of river banks and beds and the connectivity of rivers. Full implementation of the WFD throughout all sectors is needed to resolve these potential conflicts and to commit all users in a river basin to focus on the achievement of healthy water bodies with good ecological status.

First reporting under the WFD was finished in 2011 and this report presents first results and assessment of EU surface waters based on the national reporting under the WFD scope performed by countries on RBD level.

Significant pressures and impacts, which were identified based on assessing the risk of failing the WFD objectives, were also reported and are included in the report. The analyses of impacts and pressures under WFD considers how pressures would be likely to develop, prior to 2015, in ways that would place water bodies at risk of failing to achieve ecological good status, if appropriate additional programmes of measures were not designed and implemented. WFD approach focuses on the use of the DPSIR (Driver, Pressure, State, Impact and Response) concept.

Disclaimer
The current draft is based on data delivered by the Member States via WISE up to summer 2011 and in some cases information available in digital version of RBMPs. Where MS did not deliver data or the RBMPs are not yet available, information from the specific MS or RBDs are not presented.

Where data are available, it has been dealt with, and is presented, to the best of our knowledge. Nevertheless inconsistencies and errors cannot be ruled out. *Comments and remarks on results are very much appreciated*.

The current draft is partly based on copy and paste of text from the multitude of documents produced on the WFD (Commission and national WFD guidance documents, RBMPs and Article 5 reports etc.). Sources have in most cases been listed (to be improved in next draft).

2. Introduction to Water Framework Directive

The Water Framework Directive (WFD) [1], which came into force on 22 December 2000, establishes a new framework for the management, protection and improvement of the quality of water resources across the European Union (EU). The WFD established new and better ways of protecting and improving our water environment with the overall objective of achieving co-ordinated and integrated water management across Europe.

The WFD calls for the creation of River Basin Districts. In case of international districts that cover the territory of more than one EU Member State the WFD requires coordination of work in these districts.

EU Member States should aim to achieve good status in all bodies of surface water and groundwater by 2015 unless there are grounds for derogation then achievement of good status may be extended to 2021 or by 2027 at the latest. Good status means that certain standards have been met for the ecology, chemistry and quantity of waters. In general terms 'good status' means that water only shows slight change from what would normally be expected under undisturbed conditions. There is also a general 'no deterioration' provision to prevent deterioration in status.

The Water Framework Directive establishes a legal framework to protect and restore clean water in sufficient quantity across Europe. It introduces a number of generally agreed principle and concepts into a binding regulatory instrument. In particular, it provides for:

- Sustainable approach to manage an essential resource: It not only considers water as a valuable ecosystem, it also recognises the economy and human health depending on it.
- Holistic ecosystem protection: It ensures that the fresh and coastal water environment is to be protected in its entirety, meaning all rivers, lakes, transitional (estuaries), coastal and ground waters are covered.
- Ambitious objectives, flexible means: The achievement of "good status" by 2015 will ensure satisfying human needs, ecosystem functioning and biodiversity protection. These objectives are concrete, comparable and ambitious. At the same time, the Directive provides flexibility in achieving them in the most cost effective way and introduces a possibility for priority setting in the planning.
- Integration of planning: The planning process for the establishment of river basin management plans needs to be coordinated to ultimately achieve the WFD objectives.
- The right geographical scale: The natural area for water management is the river basin (catchment area). Since it cuts across administrative boundaries, water management requires close cooperation between all administrations and institutions involved. This is particularly challenging for transboundary and international rivers.
- Polluter pays principle: The introduction of water pricing policies with the element of cost recovery and the cost-effectiveness provisions are milestones in application of economic instruments for the benefit of the environment.

[1] OJ L L327, 22.12.2000, p.1 as amended by Decision 2455/2001/EC (OJ L 331, 15.12.2001, p. 1)

- Participatory processes: WFD ensures the active participation of all businesses, farmers and other stakeholders, environment NGOs and local communities in river basin management activities.
- Better regulation and streamlining: The WFD and its related directives (Groundwater Daughter Directive (2006/118/EC); Floods Directive COM(2006)15) repeal 12 directives from the 1970s and 1980s which created a well-intended but fragmented and burdensome regulatory system. The WFD creates synergies, increases protection and streamlines efforts.

Implementation of the Directive is to be achieved through the river basin management (RBM) planning process which requires the preparation, implementation and review of a river basin management plan (RBMP) every six years for each river basin district (RBD) identified. This requires an approach to river basin planning and management that takes all relevant factors into account and considers them together. There are four main elements of the process:

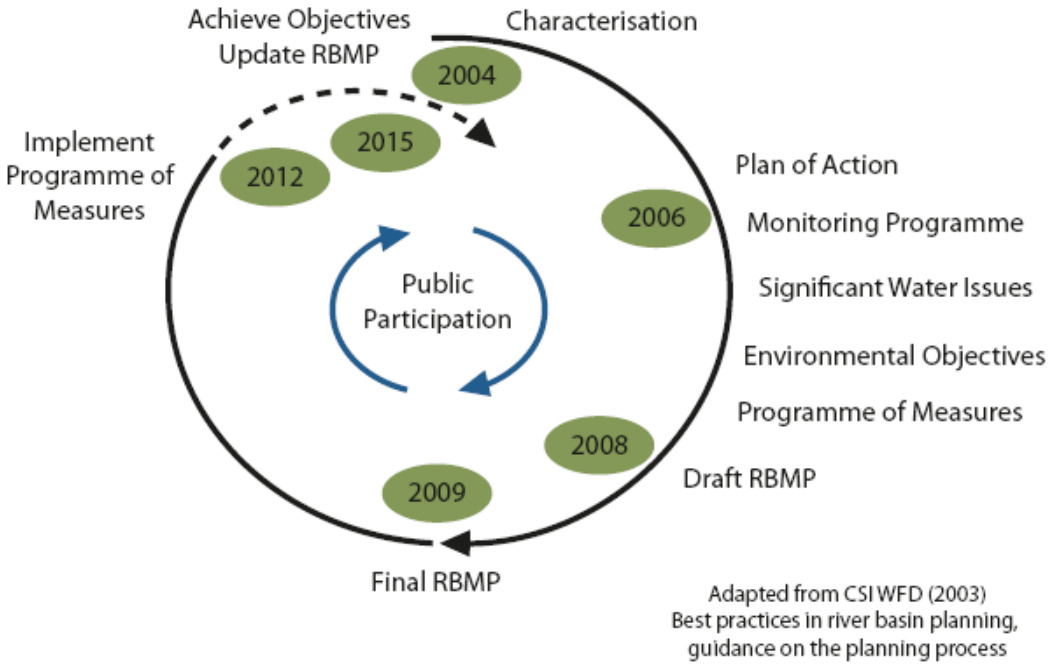
- 'characterisation' of the river basin district and the pressures and impacts on the water environment;
- environmental monitoring based on river basin characterisation;
- setting of environmental objectives; and
- design and implementation of a programme of measures to achieve environmental objectives.

River basin planning process

River Basin Management Plans are plans for protecting and improving the water environment and have been developed in consultation with organisations and individuals. River basin planning is a strategic decision-making process that integrates the management of land and water within river basin districts. The river basin management planning process aims to improve and support sound and sustainable water management to deliver the requirements of the WFD while balancing the environmental, social and economic needs within the river basin district.

- The river basin planning process started more than ten years ago with implementation of the WFD in national legislation and establishing the administrative structures.
- The river basin planning process resulted in 2004 with an analysis of the pressures and impacts affecting the water environment in the river basin district. The findings were published in March 2005 in the characterisation report required by Article 5 of the WFD.
- River basin planning is a gradual cyclical process that involves public participation throughout. Characterisation is followed by a series of steps shown in Figure 1.

Figure 1: The river basin planning process



Monitoring and classification: In 2006 monitoring programs within the RBDs had to be established.
The WFD monitoring network will enable us to identify further problems and resolve them, thereby improving the water environment. It is a core concept of the WFD that the condition of biological communities is used to assess the ecological quality of surface waters

The new classification system covers all surface water bodies, and is based on a new ecological classification system with five quality classes. It has been devised following EU guidance and is underpinned by a range of biological quality elements, supported by measurements of chemistry, hydrology (changes to levels and flows) and morphology (changes to the shape and function of water bodies). Some of the quality elements used in the ecological classification system have only seldom been monitored in Member States before.

The reports and consultation on **Significant Water Management Issues** (SWMIs) in 2007 and 2008 were important steps leading towards the production of the first RBMPs.

Status and objective setting: If a water body does not currently achieve the required WFD aim of having "good status", there is need to set an objective stating what improvement will be made and by when - for example, to reach good ecological status by 2015.

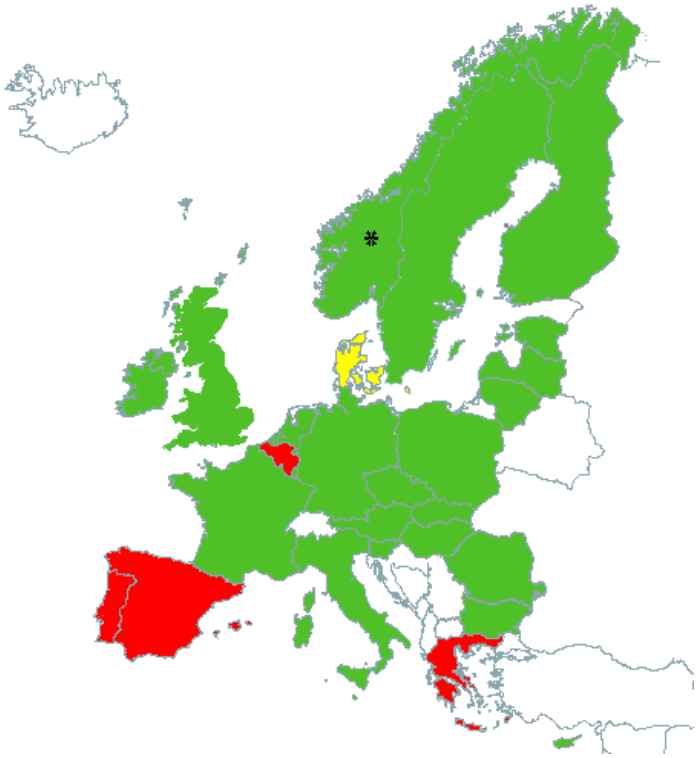
The River Basin Management Plans (RBMPs) describe the measures that must be taken to improve the ecological quality of water bodies and help reach the objectives of the WFD. The WFD requires via the RBMPs a programme of measures (PoM) to be established for each RBD. The measures implemented as part of the programme should enable water bodies to achieve the environmental objectives of the WFD. The PoM must be established by December 2009 and be made operational by December 2012.

3. River Basin Management Plans

3.1. Available River Basin Management Plans (RBMPs)

According to the WFD River Basin Management Plans should since 22.12.2009 be available in all River Basin Districts across the EU. There are however serious delays in some parts of the EU, and in some countries consultations are still on-going.
(Status 10/06/2011).

GREEN - River Basin Management Plans adopted.
YELLOW - consultations finalised, but awaiting adoption.
RED - consultation have not started or ongoing.
* *Norway is implementing the Water Framework Directive as part of the European Economic Area Agreement, with specific timetable agreed.*



Source: DG Environment http://ec.europa.eu/environment/water/participation/map_mc/map.htm

In the summer 2011 22 EU Member States have had their RBMPs adopted. Denmark had the consultation finalised but the RBMPs not yet adopted and four countries Portugal, Spain, Greece and the Walloon and Brussels part of Belgium had not yet finalised the consultation of the RBMPs and therefore no adopted RBMPs.

Most of the countries with adopted RBMPs have reported data from the RBMPs to the WISE-WFD database. However, of the countries with adopted RBMPs data reporting are still missing from Cyprus and Slovenia and not complete from several of the countries.

Spain and Greece have reported data from their RBMPs to the WISE-WFD database. *These data have been included into the analysis presented on ecological status and pressures.*

RBMPs not adopted Member States: RBDs:	Cyprus, Denmark, Greece, Portugal, Portugal,
No data from	Cyprus, Denmark, Portugal, and Slovenia – Belgium: Brussels & Wallonia and Norway
Missing RBDs from Member States that have reported data	Spain: Segura (ES070); Poland: Vistula (PL2000) and Ucker (PL6700); France: Les cours d'eau de Mayotte (FRM);
No GES:	Finland Åland; Italy; Greece; IE (Check)

3.2. WISE-WFD data reporting and database

Member States have in addition to the digital version of the River Basin Management Plans (RBMPs) reported a comprehensive set of data related to the results of the RBMPs such as ecological status for each individual water body or significant pressures affecting a water body.

The WFD-CIS Guidance Document No. 21 "Guidance for reporting under the Water Framework Directive"[2] provides the specification of the data that have to be reported by MS in relation RBMPs.
<text to be extended /improved>

0.1.1 Status of WISE-WFD database – version of database used by EEA Autumn 2011

In the summer 2011 most of the MS had reported data tables (indicated by green and yellow (partial complete) colour) in the XML column in the table below. The data reported in XML tables have had a first QA/QC and are transferred into a WISE-WFD database.

Figure: State of play RBMPs and WISE report. Table from Atkins presentation at the latest WFD-CIS WG-D meeting 25/09/2011.

State of Play RBMPs and WISE reporting

MS	RBMP adopted	WISE reporting			MS	RBMP adopted	WISE reporting			MS	RBMP adopted	WISE reporting		
		RBMP reported	XML	GIS			RBMP reported	XML	GIS			RBMP reported	XML	GIS
AT	☺	☺	☺	☺	ES	☹	☹	😐	😐	MT	☺	☹	☺	☺
BE	☹	😐	😐	😐	FI	☺	☺	☺	☺	NL	☺	☺	☺	☺
BG	☺	☺	☺	☺	FR	☺	☺	☺	☺	PL	☺	☺	☺	☺
CY	☺	☺	☺	☺	HU	☺	☺	☺	☺	PT	☹	☹	☹	☹
CZ	☺	☺	☺	☺	IE	☺	☺	☺	☺	RO	☺	☺	☺	☺
DE	☺	☺	☺	☺	IT	☺	☺	☺	☺	SE	☺	☺	☺	☺
DK	😐	☹	☹	☹	LT	☺	☺	☺	☺	SI	☺	☹	☹	☹
EE	☺	☺	☺	☺	LU	☺	☺	☺	😐	SK	☺	☺	☺	☺
EL	☹	☹	😐	☺	LV	☺	☺	☺	☺	UK	☺	☺	☺	☺

NOTES: Status: 26/09/2011
The column "RBMP adopted" reflects the contents of DG Environment's web page:
http://ec.europa.eu/environment/water/participation/map_mc/map.htm
GREEN - River Basin Management Plans adopted!
YELLOW - consultations finalised, but awaiting adoption.
RED - consultation have not started or ongoing.

The WISE reporting columns reflect if largely complete (**green**), partial (yellow) or no reporting (**red**) has been done on the three parts expected:
- Copies of the RBMP and PoM
- XML files
- GIS files

If the plan has not been yet been finalised and adopted it is assumed that the information submitted in WISE reflects draft plans.

[2] http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework_directive/guidance_documents/guidance_guidance_report/_EN_1.0_&a=d

Source: http://circa.europa.eu/Members/irc/env/wfd/library?l=/working_groups/new_wg_reporting/meetings/28-29_september&vm=detailed&sb=Title&cookie=1

EEA has been using the WISE-WFD database version end August provided by Atkins.
This database contained information from 23 MS and it is covering more than 100 000 surface water bodies (for details of the coverage of. the used WFD-WISE database on surface RBDs, categories of water bodies etc. see next chapter).

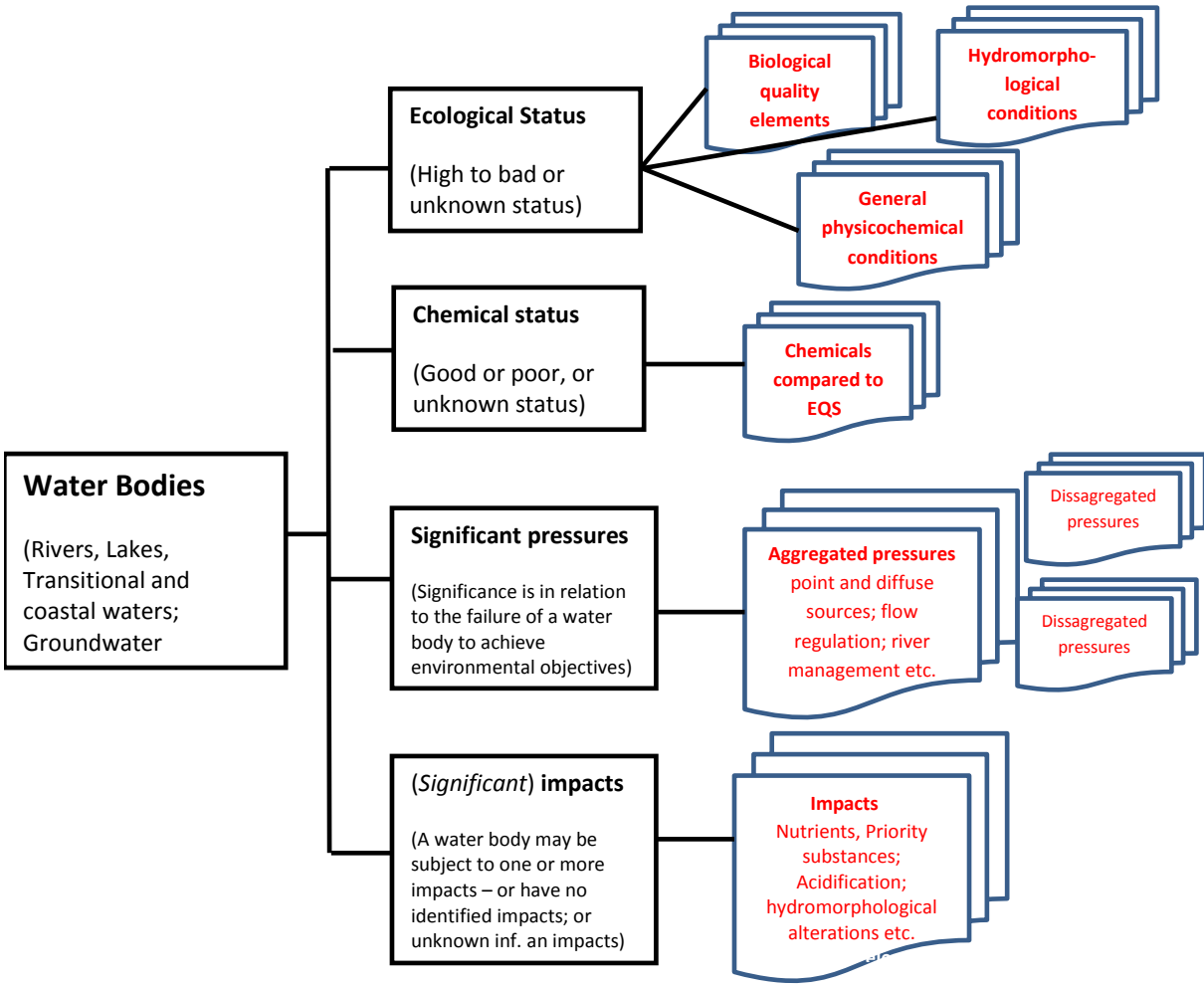
In the following is described some of the methodology issues, quality issues and shortcomings in relation to analysing the data in the database.

Data in relation to water bodies
A set of information is reported for each water body. A surface water body have information on:

- the *ecological status/potential* and *chemical status*. This information is based on more detailed information on biological quality elements (e.g. macroinvertebrates; phytoplankton); general physiochemical conditions (general water quality information e.g. nitrate and phosphorus); and hydromorphological conditions.
- *Significant pressures* such as pressures related to diffuse sources or water flow regulation. More than one pressure may apply to a water body. Significance is in relation to the failure of a water body to achieve environmental objectives.
- Impacts such water body being subject to nutrient enrichment; contamination by priority substances; acidification; and alteration of habitats etc. A water body may be subject to more than one impact.

A water body may be in good (or high) status and therefore have no significant pressure or impact. However, no reported pressures and impact may also mean that pressures and impacts have not been reported/identified.

Figure X: Conceptual overview of reported information in relation to a water body



Notes
Significant pressures: MS are required to report on the significant pressures on surface and groundwater water bodies. Significance is in relation to the failure of a water body to achieve environmental objectives. More than one pressure may apply to a water body.
Significant pressures have been reported at different levels of aggregation. For example, point source discharges might be reported at three levels of aggregation: 1 Point Source, 1.1 Point - UWWT_General and 1.1.1 Point - UWWT_2000.
Significant impacts: Number and percentage of water bodies that are reported as being subject to the indicated significant impacts. A water body may be subject to more than one impact.

Ecological status and potential

Assessment of ecological status/potential according to WFD provisions is important, since one main WFD objectives is to achieve at least 'good ecological quality status' for all surface water bodies by 2015. For those waters, reported as they will not reach environmental objectives based on current level of management, additional management measures are assigned by countries. Countries are required to set up appropriate monitoring so that the follow up reporting (in 2015) will show how successfully countries implemented the WFD requirement and related management measures.

Classification of ecological status and potential (ES/P) is based upon the biological elements (phytoplankton, macroalgae, benthos and fishes), hydromorphological, physico-chemical

quality elements and non- priority pollutants. Biological elements are being especially important, since they reflect the quality of water and disturbance of environment over longer period of time, i.e. over their life time. The ES/P is reported under WFD reporting scheme for each water body. Water bodies are determined by their category (river, lake, transitional, coastal) and by their different natural characteristic in each river basin. The approach to identify these water bodies includes also the sub-division of a water body into smaller water bodies, according to pressures and significant impacts.

WFD has different requirements for natural waters and for artificial or heavily modified waters. 'Artificial water bodies' are those, created by human activity (e.g. an artificial lagoon in the area where there was naturally no water before). 'Heavily modified water bodies' (HMWB) are waters, where significant physical alterations by human activity took place to such extent that their hydro-geomorphological character was altered (e.g. large harbour). For natural water bodes the ecological status is standard for classification, while for heavily modified and artificial water bodies the ecological potential should be determined. The WFD objective for these waters is to achieve 'Good ecological potential', which is less stringent than requirements to achieve 'Good ecological status', as is required for natural waters.

Typology and reference conditions

Typology is the means by which surface water bodies are differentiated according to their physical and physico-chemical characteristics. The resulting types will indicate, in very general terms, the sorts of plants and animals that are likely to be present. For example, the sorts of animals and plants that are found in shallow, exposed coastal waters are very different from those found in deep sea loughs.

The task of establishing types is important because reference conditions are established in relation to types. Reference conditions (which equal high status) represent nearly undisturbed conditions and provide the base on which the quality status classification scheme will be built.

Intercalibration

Text on intercalibration to be included

In order to achieve a consistent implementation of the Water Framework Directive (WFD) across the EU, the European Commission has established an intercalibration process which will ensure that a common understanding of 'high' and 'good' status is used in making water body status assessments.

Work on the process is being taken forward through a number of Geographical Intercalibration Groups (GIGs) there are the following GIGs:

- *To be checked*
- Alpine
- Central & Baltic
- Northern
- Atlantic
- Mediterranean

Despite considerable progress that has been made since 2000, significant knowledge gaps still hinder WFD implementation. Monitoring schemes still do not cover all relevant

organism groups and lack for some regions. These gaps also affect the European intercalibration exercise that aims at ensuring the comparability of monitoring results.

Unclassified water bodies – unknown status, pressure and impact
Some water bodies have been reported with unknown ecological status/potential (unclassified) water bodies), significant pressures (no pressures) and impacts (no impacts). In most cases unknown ecological status/potential (unclassified) water bodies do not have information on pressure and impacts.

Significant pressures and impacts related to water bodies
Significant pressures and impacts, which were identified based on assessing the risk of failing the WFD objectives, were also reported and are included in the report. The analyses of impacts and pressures under WFD considers how pressures would be likely to develop, prior to 2015, in ways that would place water bodies at risk of failing to achieve ecological good status, if appropriate additional programmes of measures were not designed and implemented. WFD approach focuses on the use of the DPSIR (Driver, Pressure, State, Impact and Response) concept.

Reported status and pressure information at RBD and sub-unit level
No ecological and chemical status information and information on significant pressures and impacts has been reported via WFD-WISE at aggregated level (RBD and subunit), however methodology descriptions, information on pressures (e.g. water abstractions, pollution emissions etc.) has generally been reported at aggregated level.

Details on loads of pollutants discharges or emissions from point and diffuse sources, and on volumes of water abstracted have not been included in the current assessment.

3.3. Methodology notes

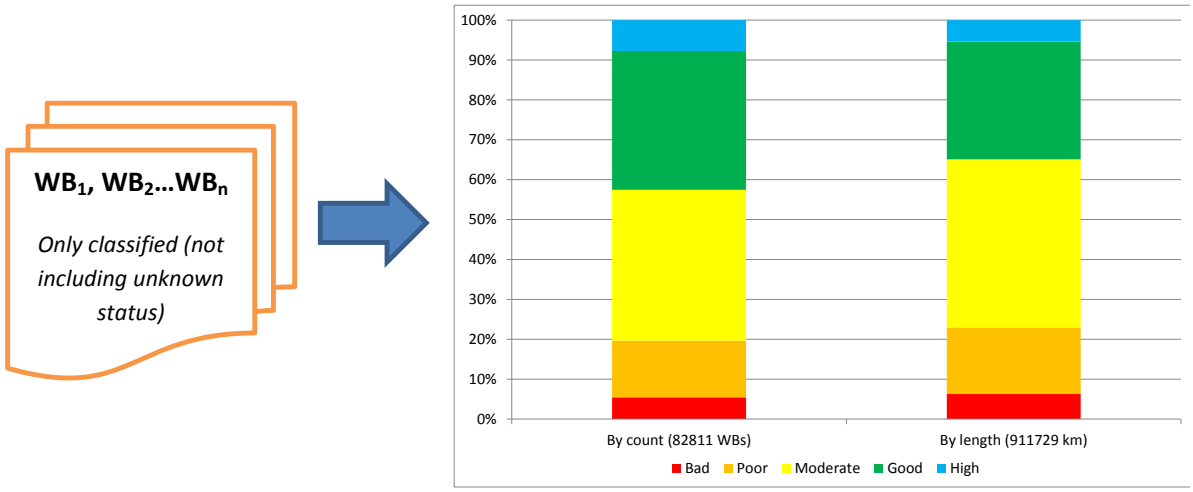
To be further developed

No differentiation between ecological status and potential
In the analysis, no distinction has been made between ecological status and potential. The criteria for classification of natural (status) and artificial or heavily modified water bodies (potential) vary, but the ecological conditions they reflect are assumed to be comparable. This assumption may not be correct for countries that have used the pragmatic approach to set ecological potential (see background above). Nevertheless, all varieties of fresh surface water bodies have been merged, to be able to give an overall picture of the state of Europe's; regional and country surface water.

Aggregation from WB information to RBD/country/regional/European level
Information on ecological and chemical status, significant pressures and impacts has been aggregated RBD/country/regional/European level and is presenting:

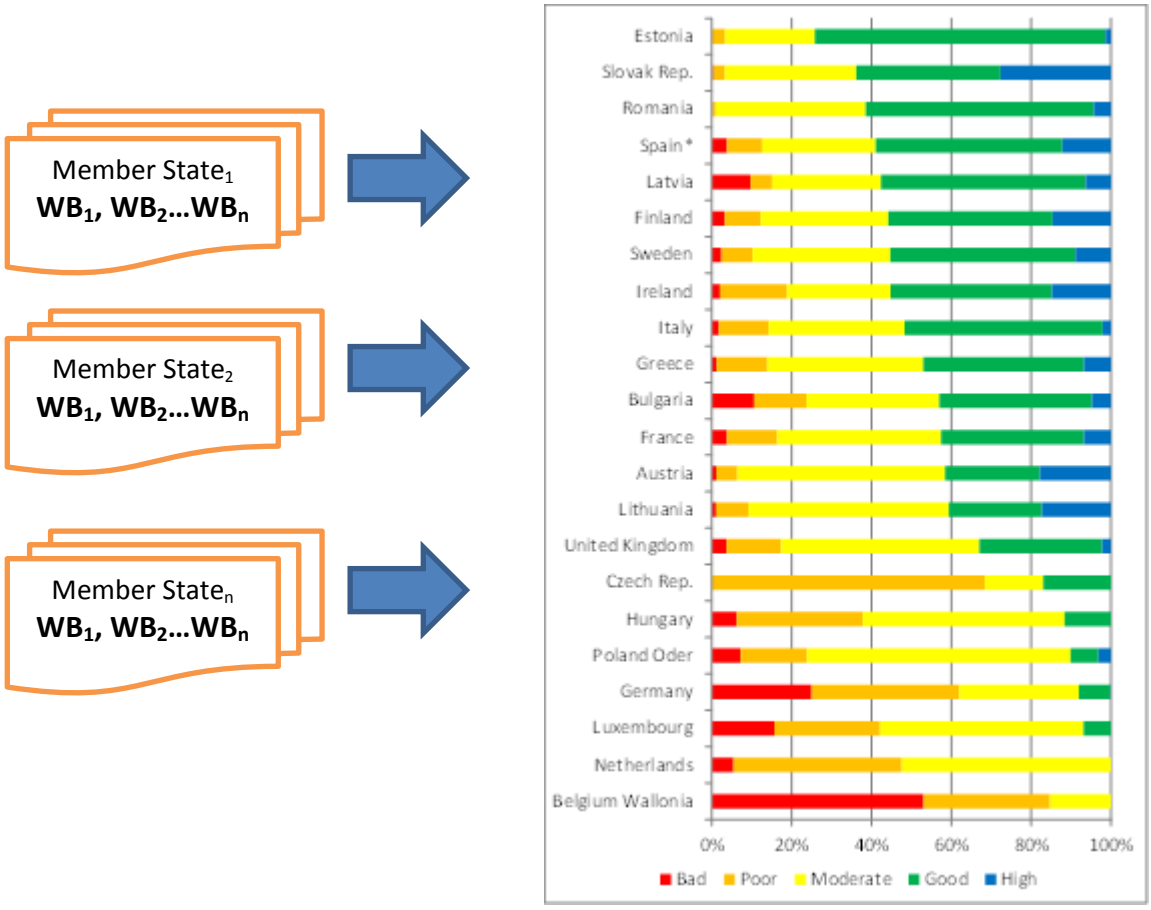
- Percentage, number and length/area of water bodies in the different classes of ecological and chemical status.
- Percentage, number and length/area of water bodies in affected by different significant pressures and impacts.

Figure Aggregation of ecological status/potential to European overviews



More text to be included

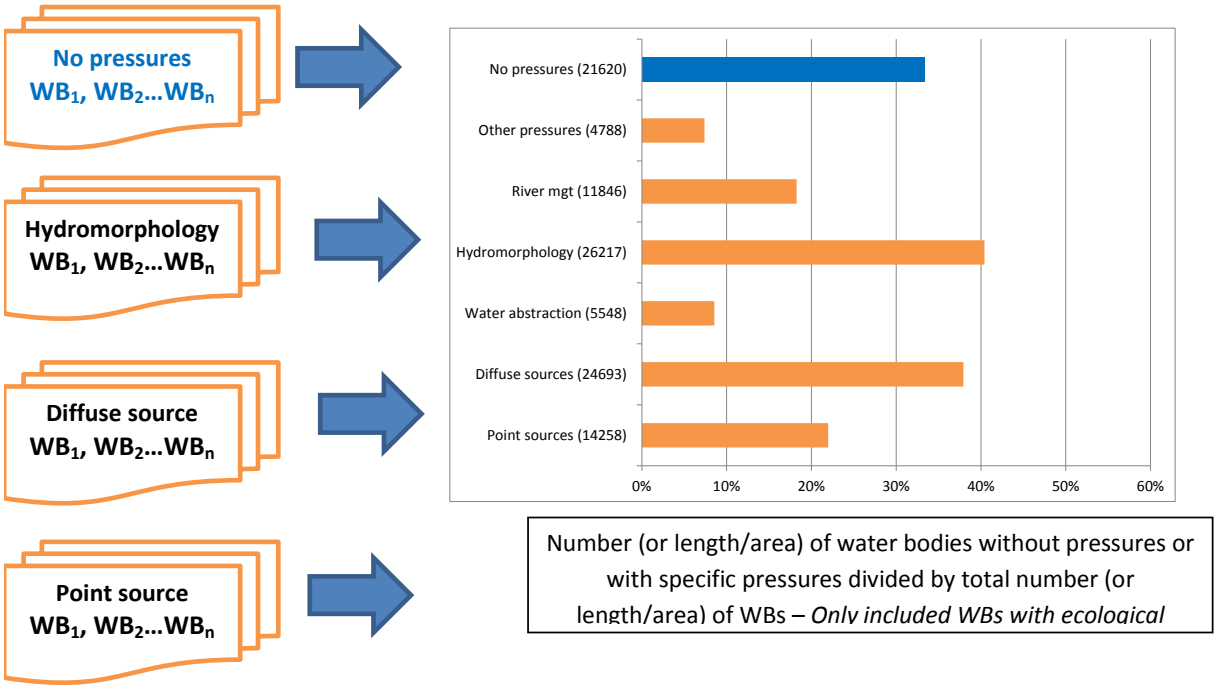
Figure Aggregation of ecological status/potential to country comparison.

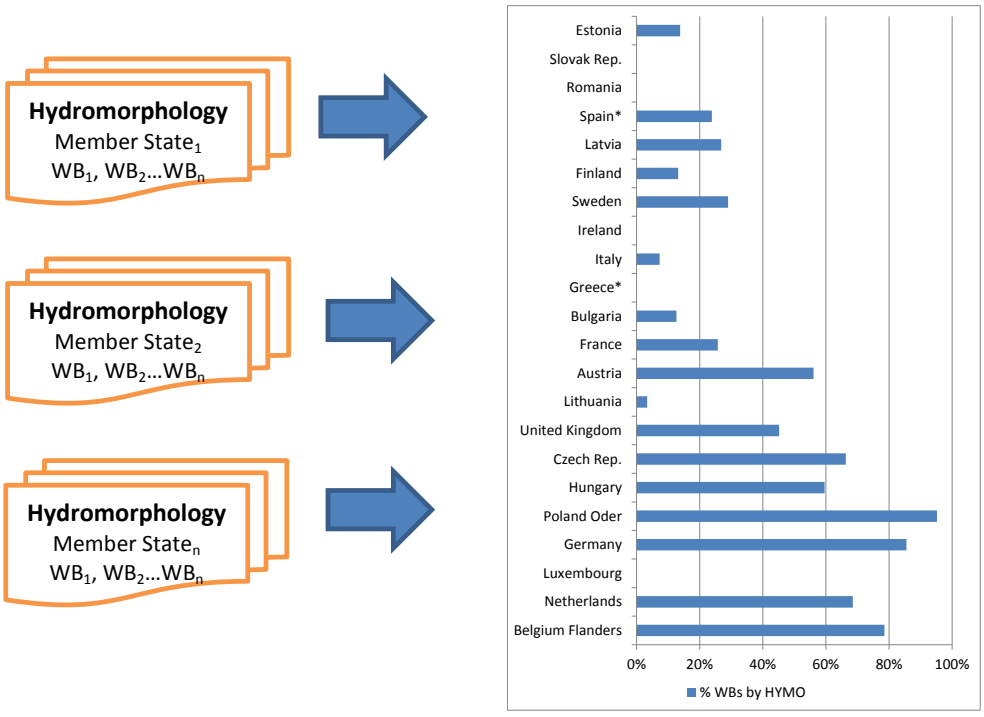


Text to be included – here could information of data quality be included.

Methodology issues related to aggregation of pressures to be described

Figure Aggregation of pressures (and impact) information





4. River Basin Districts

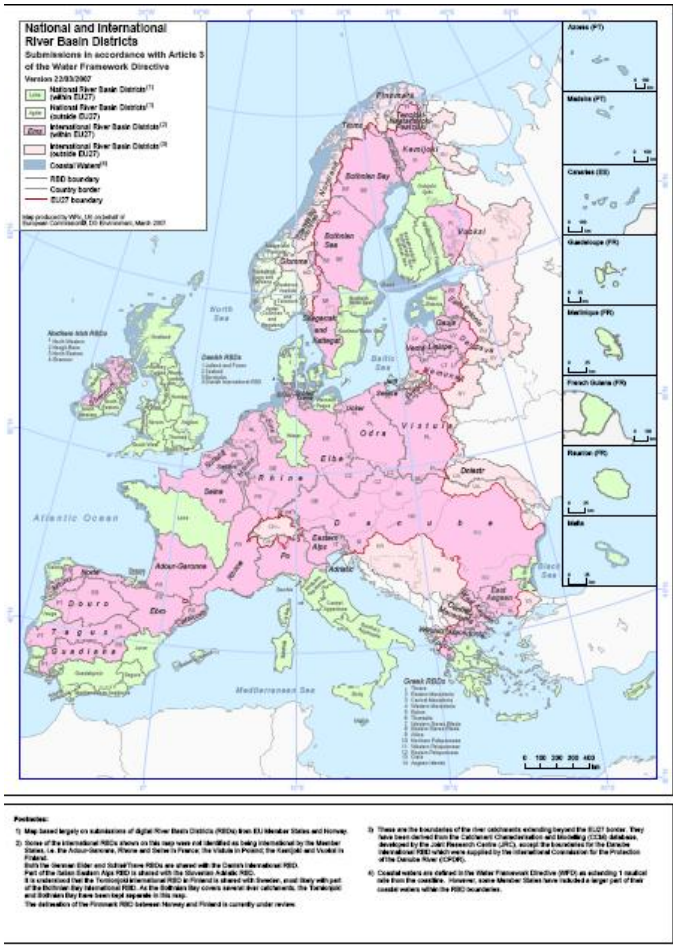
Freshwater ecosystems in Europe are rich in biodiversity and provide essential ecosystem services to humans Europe's freshwater ecosystems range from large and small rivers, floodplains, lakes and ponds, freshwater marshes to man-made water bodies such as canals and reservoirs (EC, 2007a,b) They encompass a broad ensemble of wetlands together with saline, marine and coastal sites. These different systems also interact with groundwater conditions.

Around 250 species of macrophytes and 250 species of fish inhabit European inland surface waters, and a significant number of birds, fish and mammals depend on wetlands for breeding or feeding (EC, 2007a). Freshwater ecosystems provide many important goods and services including the provision of food, clean water, transport of wastewater, and flood and erosion control (IUCN, 2008).

4.1. Overview of River Basin Districts/ Characterization of RBDs

The implementation of the WFD has resulted in the establishment of 110 river basin districts (RBDs) across the EU. Since 40 river basin districts are international, there are a total of 170 national or national parts of international river basin districts. The international river basin districts cover more than 60% of the territory of the EU making the international coordination aspects one of the most significant and important issue and challenge for the WFD implementation.

Map 4.1 Map of national and international river basin districts



Note: Map to be updated
Source: DG Environment http://ec.europa.eu/environment/water/water-framework/facts_figures/pdf/2007_03_22_rbd_a3.pdf

4.1.1. Reported RBDs

Ultimo August 2011data from 142 river basin districts (RBDS) have been uploaded to the Country Data Repository (CDR) and incorporated into the WFD-WISE database. There are still missing reporting from some countries and RBDs. The smaller and medium size Member States generally have 1-5 RBDs, while Spain, the United Kingdom, France, Greece, Sweden, Finland, Germany, Poland and Portugal have 8 to 15 RBDs.

Table 4.1 Overview of reported RBDs per Member State and missing MS/RBDs

Member States	RBDs	Member States	RBDs	*Missing countries and RBDs*	RBDs
Austria	3	Latvia	4	Belgium (Wallonia & Brussels)	(6)
Belgium Flanders	2	Lithuania	4	Cyprus	(1)
Bulgaria	4	Luxembourg	2	Denmark	(4)
Czech Rep.	3	Malta	1	Portugal	(8)
Estonia	3	Netherlands	4	Slovenia	(2)
Finland	8	Poland*	8	Poland	(1?)
France	13	Romania	1	Spain	(1?)
Germany	10	Slovak Rep.	2	France	(1?)
Greece	14	Spain*	15	Norway	(9)
Hungary	1	Sweden	10	Italy	(?)
Ireland	7	United Kingdom	15	**Missing RBDs**	**33**
Italy	8	**Total reported RBDS**	**142**		

Note: Table to be updated -
Source: Extract from WISE-WFD (version Ultimo August 2011)

Only rivers arising deep inside the continent are relatively large. Many central European countries are drained by only a few river catchments. For example, the Wisla and Oder drain more than 95 % of Poland, and the Danube drains most of Austria, Hungary, Romania, Serbia, Slovak Republic and Slovenia. France, Germany and Spain are drained by relative few large rivers and these countries have several large RBDs.

Countries with long coastlines, for example, the United Kingdom, Ireland, Norway, Sweden, Denmark, Italy and Greece, are usually characterised as having large numbers of relatively small river catchments and short rivers; the three to four largest of which drain only 15% to 35 % of their area. In these countries a number of river catchments have been merged to RBDs.

International river basins: Within the European Union there are many river basins which are shared between Member States. An important feature of the Directive is a planning mechanism, referred to as international river basin plans, by which Member States should co-operate to ensure that environmental objectives targets are met.

Size of RBDs

The size of the RBDs varies considerably from very small ones below 1,000 km^2 to the largest one, the Danube with over 800,000 km^2. Obviously, the international RBDs are

generally larger. The average size of current reported (national) RBDs is about 30 000 km^2. There are 38 and 27 RBDs with an area greater than 15 and 50 000 km^2, respective. These two size categories cover 24 % and 65 % of the reported area. More than half of the population are found in the RBDs larger than 50 000 km^2.

Table 4.2 Reported RBD divided by size of the RBD.

Size of RBD (km2)	Number of RBDs	Sum of area (1000 km2)	Sum of population (mio.)
< 5000	30	54	11,3
5-15000	38	383	36,0
15-50000	37	978	120,9
> 50000	27	2608	205,1
Total	132	4023	373,3
RBDs that are missing area information on area	10 These RBDs are generally small & Italy		

Source: Extract from WISE-WFD (version Ultimo August 2011)
Notes: to be updated
Spreadsheet:

Table 4.3 River Basin Districts greater than 50 000 km2

By country		
AT1000	Danube	80565
DE1000	Danube River Basin District	56295
DE2000	Rhine River Basin District	102100
DE5000	German Elbe	148268
ES020	Duero	78856
ES030	Tagus	55645
ES040	Guadiana River Basin District	55528
ES050	Guadalquivir	57228
ES091	Ebro	85570
FIVHA1	Vuoksi River Basin District	58158
FIVHA2	Kymijoki-Gulf of Finland RBD	57074
FIVHA3	Kokemäenjoki-RBD	83357
FIVHA4	Oulujoki-Iijoki River Basin District	68084
FIVHA5	Kemijoki River Basin District	54850

FRD	Le Rhône	123491
FRF	L'Adour, la Garonne, la Dordogne,	118897
FRG	La Loire,	169204
FRH	La Seine	96527
FRK	la Guyane	83846
HU1000	Hungarian part of the DanubeRBD	93011
PL6000	Oder River Basin District	118015
RO1000	Danube River Basin District	239100
SE1	Bothnian Bay (Sweden)	147000
SE2	Bothnian Sea (Sweden)	140000
SE4	South Baltic Sea (Sweden)	54000
SE5	Skagerrak and Kattegat (Sweden)	69500
UK01	Scotland	113920

Missing: *Po, Vistula maybe more*

By area of national RBDs		
RO1000	Danube River Basin District	239100
FRG	La Loire,	169204
DE5000	German Elbe	148268
SE1	1. Bothnian Bay (Sweden)	147000
SE2	2. Bothnian Sea (Sweden)	140000
FRD	Le Rhône méditerranéens	123491
FRF	L'Adour, la Garonne, la Dordogne	118897
PL6000	Oder River Basin District	118015
UK01	Scotland	113920
DE2000	Rhine River Basin District	102100
FRH	La Seine normands	96527
HU1000	Hungarian part of the Danube RBD	93011
ES091	EBRO	85570

FRK	la Guyane	83846
FIVHA3	Kokemäenjoki River Basin District	83357
AT1000	Danube	80565
ES020	DUERO	78856
SE5	Skagerrak and Kattegat (Sweden)	69500
FIVHA4	Oulujoki-Iijoki River Basin District	68084
FIVHA1	Vuoksi River Basin District	58158
ES050	GUADALQUIVIR	57228
FIVHA2	Kymijoki-Gulf of Finland RBD	57074
DE1000	Danube River Basin District	56295
ES030	TAGUS	55645
ES040	Guadiana River Basin District	55528
FIVHA5	Kemijoki River Basin District	54850
SE4	South Baltic Sea (Sweden)	54000

Source: Extract from WISE-WFD (version Ultimo August 2011)
Notes: to be updated
Spreadsheet:

4.2. European catchments and sea regions

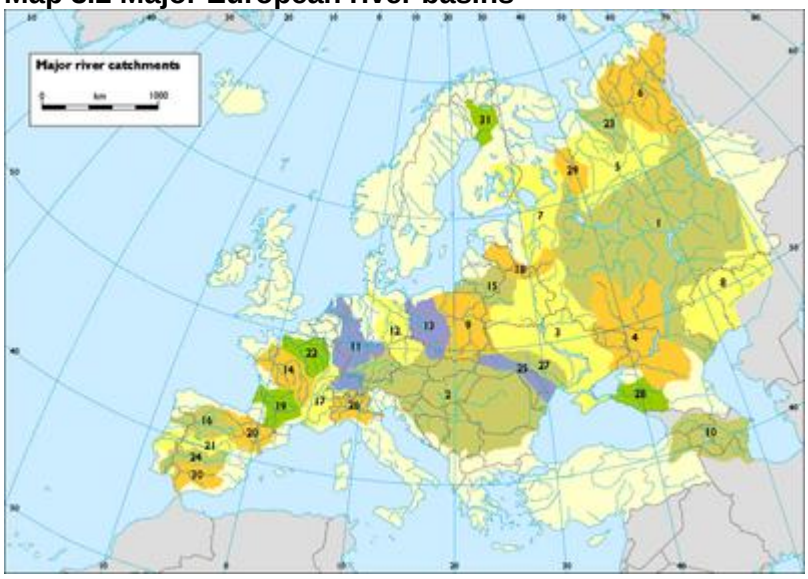
Although there are numerous European river catchments, they are relatively small and their rivers are short. About xx European rivers have a catchment area which exceeds 10 000 km^2. Only rivers arising deep inside the continent are relatively large.

In the European Union area the three largest rivers basins, the Danube (1), the xx and the (3), drain one quarter of the continent. However, they are relatively small by world standards; their catchments ranking 29th, xxth and xxth, respectively.

Europe's xx largest river basins (all of whose catchments exceed 50 000 km2) drain approximately two thirds of the continent and include:

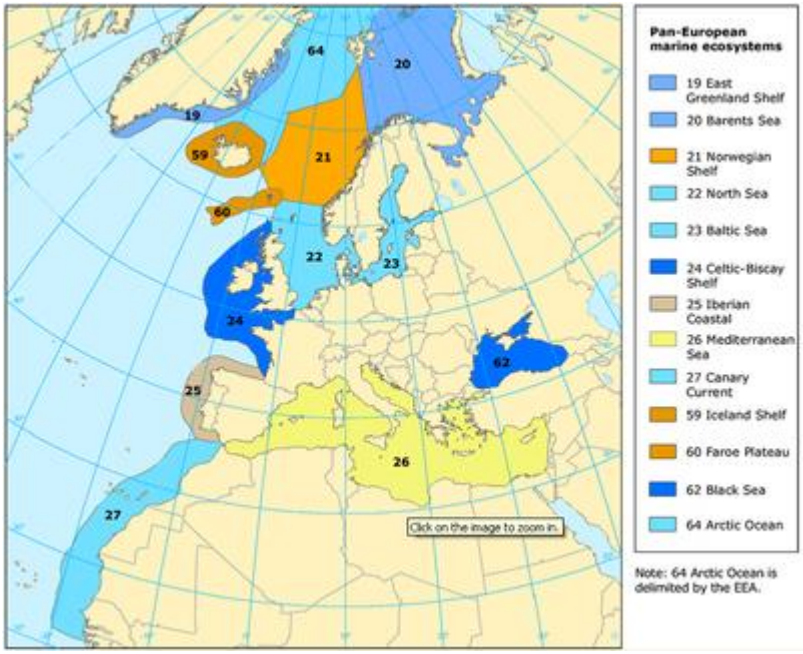
- The largest river to discharge into the Black Sea - the Danube (1). Its catchments lie in 16 countries of central Europe and the Balkans.
- The main rivers discharging into the Baltic Sea are the Neva (7), the Wisla (9), the Oder (13) and the Neman (15).
  Ten rivers with catchments larger than 50 000 km2 drain into the Atlantic and the North Sea - the Rhine (11), the Elbe (12), the Loire (14) and the Douro/Duero (16) being the largest.
- The European rivers draining into the Mediterranean - the Rhone (17), the Ebro (20) and the Po (26).

Map 3.2 Major European river basins



Source: EEA 2005.

European Sea regions



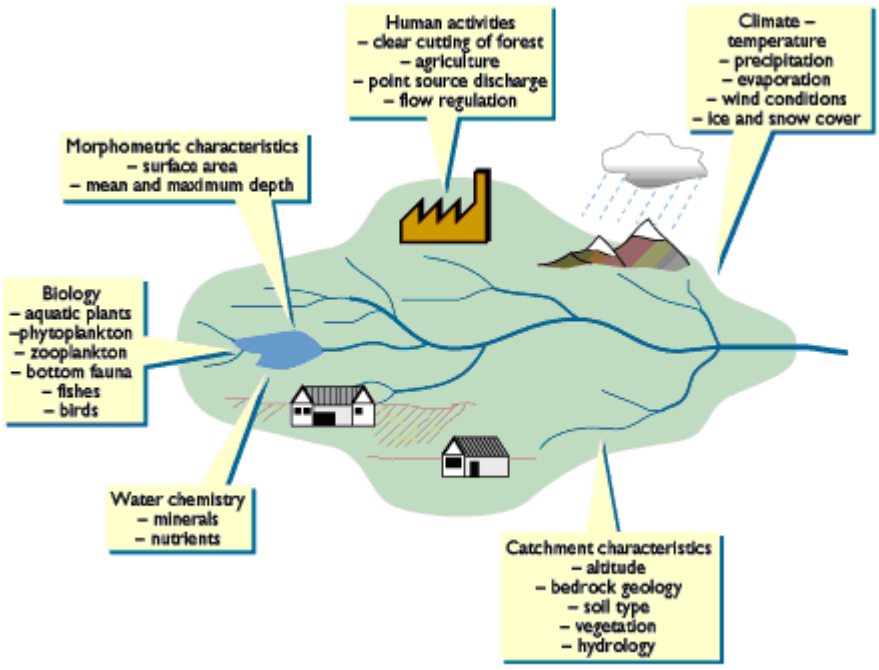
Source: missing

5. Water bodies

5.1. Introduction

Several million kilometres of flowing waters and more than a million lakes cover the European continent. Each body of water has its own characteristics. TC text . The seas around Europe have been a vital resource for over millennia. They are extensively used and provide may environmental services like fish, shipping and port development, tourism, oil and gas production, wind, and wave and tidal energy.

What affects status of Europe's waters?
The environmental status of a water body is greatly influenced by the characteristics of its catchment area (Figure 5.1). The climatic conditions, for example rain, bedrock geology and soil type, all influence the water flow. In addition, soil type impacts on the mineral content of the water. Similarly, human activity affects surface water and groundwater through afforestation, urbanisation, land drainage, pollutant discharge and flow regulation (dams and channelisation).



5.2. Surface water bodies

The WFD requires that surface waters within each river basin district be differentiated into water categories: rivers, lakes, transitional waters and coastal waters. These waters are then further sub-divided depending on their type, based on natural factors (such as altitude, longitude, geology and size) that might influence ecological communities. This division forms the basis of water bodies. Water bodies are the basic management units for reporting and assessing compliance with the Directive's environmental objectives.

Throughout the EU, more than 100 000 surface water bodies (WBs) have been defined (ca. 80% are river WBs, 17 % lakes and the remaining 3 % coastal and transitional). All MS except Malta have reported river WBs, 20 MS have reported lake WBs, and 15 and 18 MS have reported transitional and coastal WBs, respectively.

In total there are reported more than 900 000 km of river length and more than 80 000 km^2 lakes and 280 000 km^2 transitional and coastal waters.

Table 5.1: Number of countries, RBDs, water bodies, and length/area, per category.

Category	Member States	RBDs	Number of water bodies	Length or area
Rivers	22	141	82811	912 000 km
Lakes	20	126	17477	80 200 km^2
Transitional	15	77	952	13 200 km^2
Coastal waters	18	97	2774	267 600 km^2
Total	23	141	104014	

Source: Extract from WISE-WFD (version Ultimo August 2011)
Notes: Based on 142 RBDs available in WISE-WFD database (version ultimo August 2011). Wrong river length for Italy, lake area for France, and transitional and coastal area for Spain.
Spreadsheet:

Table 5.2 lists for the MS that have reported the number of RBDs, WBs per category; and river lengths and area of lakes, transitional and coastal waters.

Table 5.2: Number of RBDs, water bodies, and river lengths, area of lakes, transitional and coastal waters per country.

Co-code	Country	RBDs	River WBs	Length of Rivers	Lake WBs	Lake Area	Transitional WBs	Transitional Area	Coastal WBs	Coastal waters Area
AT	Austria	3	7339	28347	62	904				
BE	Belgium Flanders	2	177	2386	18	29	6	38	1	1
BG	Bulgaria	4	689	25275	42	53	15	103	13	1423
CZ	Czech Rep.	3	1069	18061	71	210				
EE	Estonia	3	645	11810	89	1920			16	14495
FI	Finland	8	1602	28127	4275	25958			276	32431
FR	France	13	10824	224909	439	-8262	96	2795	164	26578
DE	Germany	10	9074	121668	712	2013	5	812	74	22807
GR	Greece	14	1033	10971	29	875	29	1116	233	38280
HU	Hungary	1	869	18380	213	1152				
IE	Ireland	7	4566	18798	806	2322	190	988	111	13129
IT	Italy	8	7644	???	300	2120	181	1092	489	6529
LV	Latvia	4	205	7655	259	677	1	??	5	1105
LT	Lithuania	4	832	14251	345	4219	4	513	2	114
LU	Luxembourg	2	102							
MT	Malta	1							9	395
NL	Netherlands	4	254	4631	450	2913	5	681	15	11882
PL	Poland*	8	1926	45060	557	830	4	460	4	347
RO	Romania	1	3262	73114	131	934	2	781	4	570
SK	Slovak Rep.	2	1760	18130						

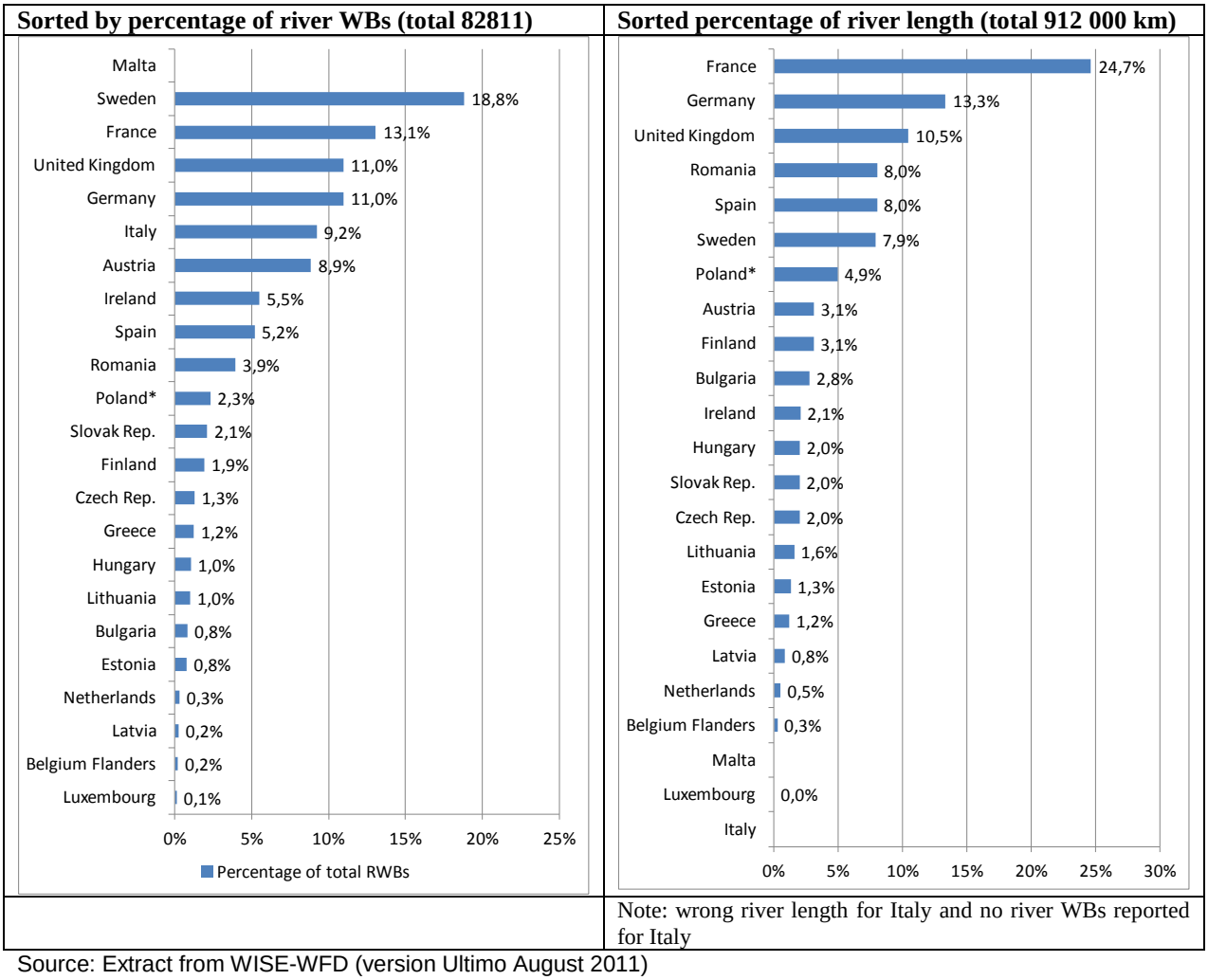
ES	Spain	15	4296	72964	328	5184	201	-37234	186	1602067
SE	Sweden	10	15563	71910	7232	26295	21	169	602	34334
UK	United Kingdom	15	9080	95282	1119	1572	192	3640	570	63170
Total		142	82811	911729	17477	80180	952	13188	2774	267590

Source: Extract from WISE-WFD (version Ultimo August 2011)
Notes: Based on 142 RBDs. Wrong river length for Italy and no river length for Luxembourg, wrong lake area for France, and wrong transitional and coastal area for Spain.
Spreadsheet: Water_bodies.xlsx

5.2.1. River water bodies

Europe has an extensive network of rivers and streams. In total more than 80 000 river WBs with a length greater than 900 000 km has been reported by MS,. Four countries, Sweden, France, UK and Germany, reported more than half of the river WBs, while three countries, France, Germany and the UK accounted for nearly half of the river length.

Figure X: Percentage river WBs and river length per Member state



Note: wrong river length for Italy and no river WBs reported for Italy

Source: Extract from WISE-WFD (version Ultimo August 2011)
Notes: Based on 142 RBDs. Wrong river length for Italy and no river length for Luxembourg, no river WBs from Malta.
Spreadsheet: Water_bodies.xlsx

Text box: Characteristics of European rivers <text to be revised and improved>

Photos to be included

A river forms a continuum, along which many parameters change: discharge, current, sediment and temperature, food sources as well as species composition. Small mountain rivers mainly have single channels, more downstream the channel changes to braided and meandering patterns.

Rivers are closely interlinked with their floodplain. Floodplains act as hydrological buffers during floods and droughts and provide a main energy source (e.g. leaves, wood, terrestrial insects) for the river macroinvertebrate community and ultimately for the fish.

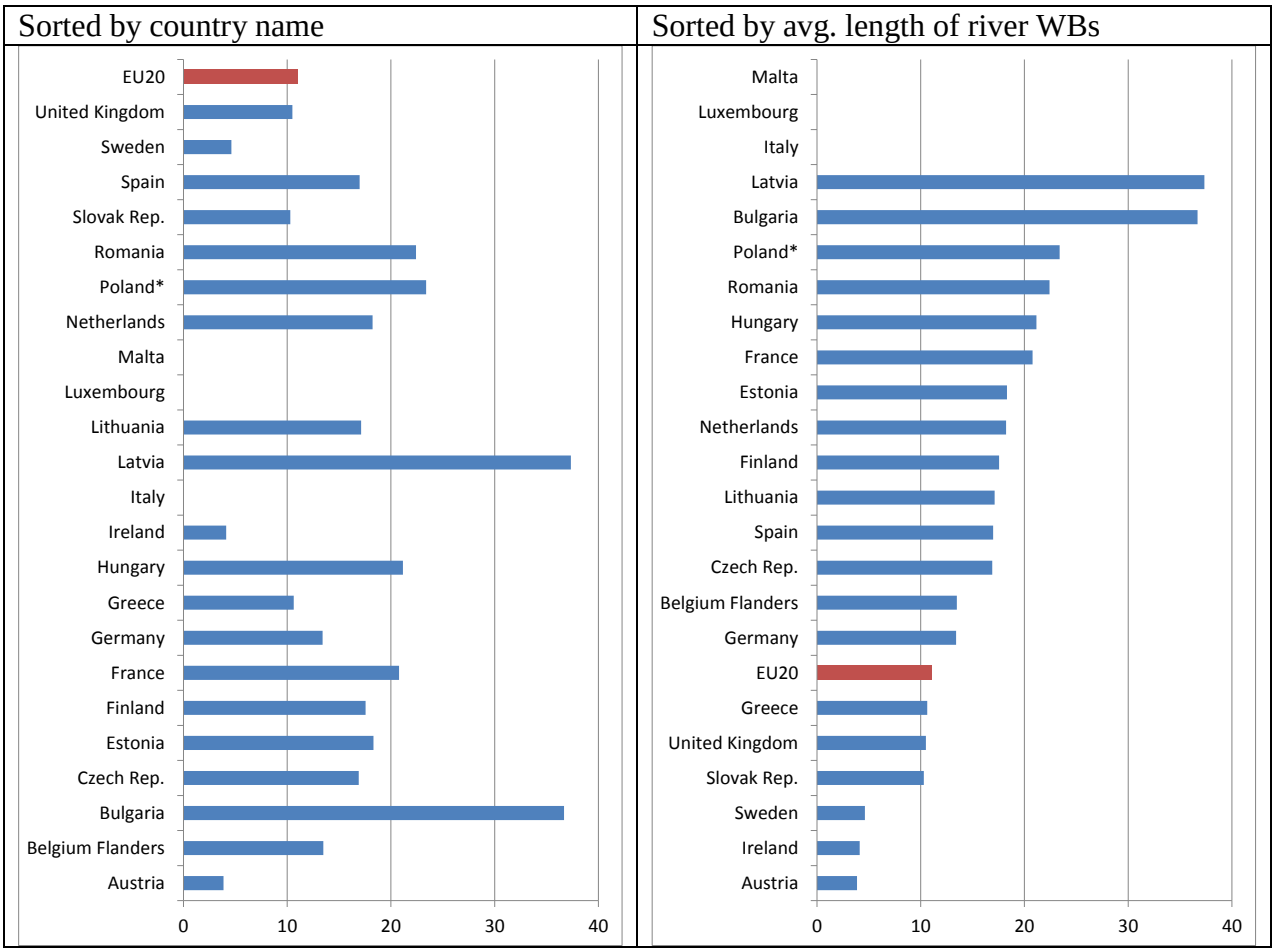
Like all other aquatic ecosystems in Europe river systems have been changed for decades or even centuries by a multitude of impacts. Nevertheless, small streams in mountain areas remained relatively undisturbed; many have never been severely polluted as opposed to the majority of large rivers. Physical alterations, however, affect most European rivers and their catchments. Longitudinal and lateral connectivity are largely disturbed and interactions between the stream and its terrestrial surrounding are disrupted.

Obviously, climate change will worsen this situation by changing discharge regimes and increasing water temperatures and associated parameters in many European regions. It will contribute to a general upstream shift of river zones, particularly affecting species bound to small streams and springs, which cannot move further upstream. Most fish of small rivers, especially the salmonids, are cold-adapted and will be particularly affected by rising temperatures.

Source: WISER http://www.wiser.eu/background/rivers/

The average size of the more than 80 000 reported river WBs is 11 km long. Four MS had river WBs more than the double size the EU20 average and Latvia and Bulgaria had river WBs longer than 30 km. Austria, Ireland and Sweden had relative small river WBs average length less than 5 km and less than half the EU20 average.

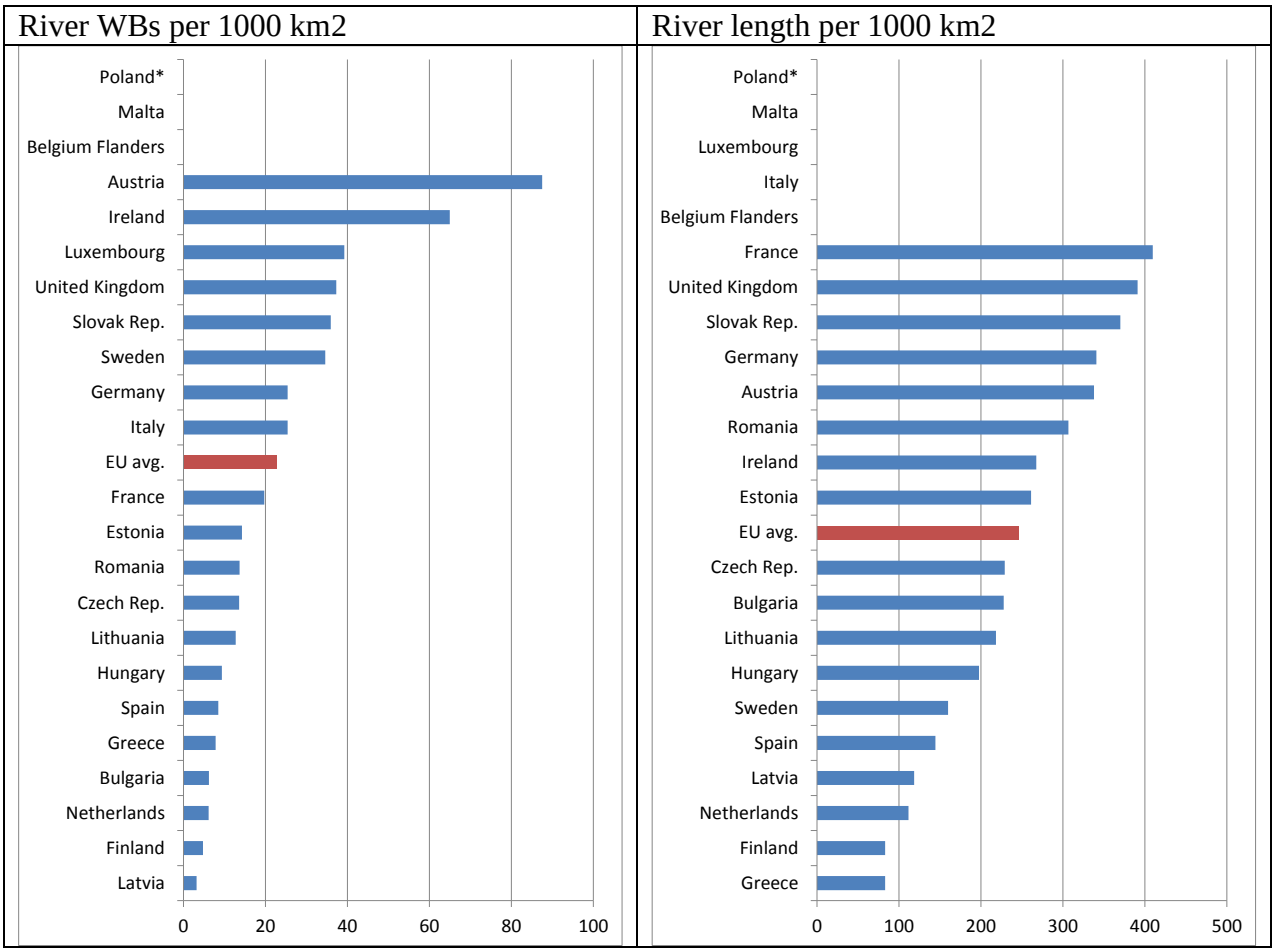
Figure X: Average length of river water bodies (km per river WB)



Source: Extract from WISE-WFD (version Ultimo August 2011)
Notes: Based on 142 RBDs. Wrong river length for Italy and no river length for Luxembourg, no river WBs reported from Malta.
Spreadsheet: Water_bodies.xlsx

Member States like Ireland and Austria have a three to four times higher density of river WBs than the EU average of around 23 river WBs per 1000 km2 of the MS territory. Five countries have a relative higher river length than the EU average. Some countries like Latvia, Finland, The Netherlands, Greece and Spain are covering much less number of river WBs and river length than the EU average.

Figure X: Number of river WBs and river length per 1000 km2 country area



Source: Extract from WISE-WFD (version Ultimo August 2011)
Notes: Based on 142 RBDs. Wrong river length for Italy and no river length for Luxembourg, no river WBs reported from Malta.
Spreadsheet: Water_bodies.xlsx

5.2.2. Lake water bodies

There are more than 500 000 natural lakes larger than 0.01 km2 (1 ha) in Europe. About 80 % to 90 % of these are small with a surface area of between 0.01 and 0.1 km2, whereas around 16 000 have a surface area exceeding 1 km2. Twenty four European lakes have a surface area larger than 400 km2.

Many natural European lakes appeared 10 000 to 15 000 years ago; being formed or reshaped by the last glacial period, the Weichsel. The ice sheet covered all of northern Europe. However, in central and southern Europe ice sheets only stretched as far as mountain ranges. As a rule, the regions comprising many natural lakes were affected by the Weichsel ice. For example, Norway, Sweden, and Finland and have numerous lakes that account for approximately 5 % to 10 % of their national surface area. Large numbers of lakes were also created in other countries around the Baltic Sea, as well as in Iceland, Ireland and the northern and western parts of the United Kingdom. In central Europe, most natural lakes lie in mountain regions. Lakes at high altitude are relatively small whereas those in valleys are larger, for example Lac Léman, Bodensee, Lago di Garda, Lago di Como and Lago Maggiore in the Alps and Lake Prespa and Lake Ohrid in the Dinarian Alps. Two exceptions are the large lakes lying on the Hungarian Plain — Lake Balaton and Lake Neusiedler.

European countries which were only partially affected by the glaciation period (Portugal, Spain, France, Belgium, southern England, central Germany, the Czech Republic, and the Slovak Republic) have few natural lakes. In these areas man-made lakes, such as reservoirs and ponds, are often more common than natural lakes. In several countries numerous small, artificial lakes have been created by other human activities such as peat and sand quarrying, and for use as fish ponds.

Source: WISER http://www.wiser.eu/background/lakes/

Lakes are highly valued focal points for leisure activities (boating, swimming), fishing and drinking water supply. They may also provide many services such as flood prevention and control, pollution reduction. Lakes are often split into two main types (shallow and deep lakes) as they tend to have different sensitivities to pressures such as water pollution and climate change.

High quality shallow lakes are characterised by healthy submerged plant communities and associated diverse communities of invertebrates, fish and wetland birds. Phytoplankton is also present but typically less important for primary production than in deep lakes due to higher flushing, grazing of zooplankters.

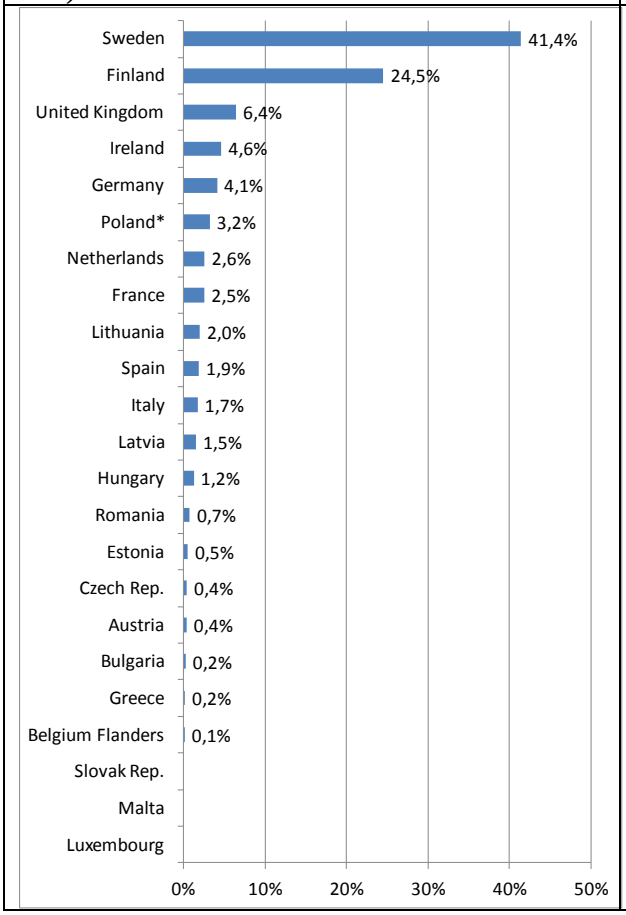
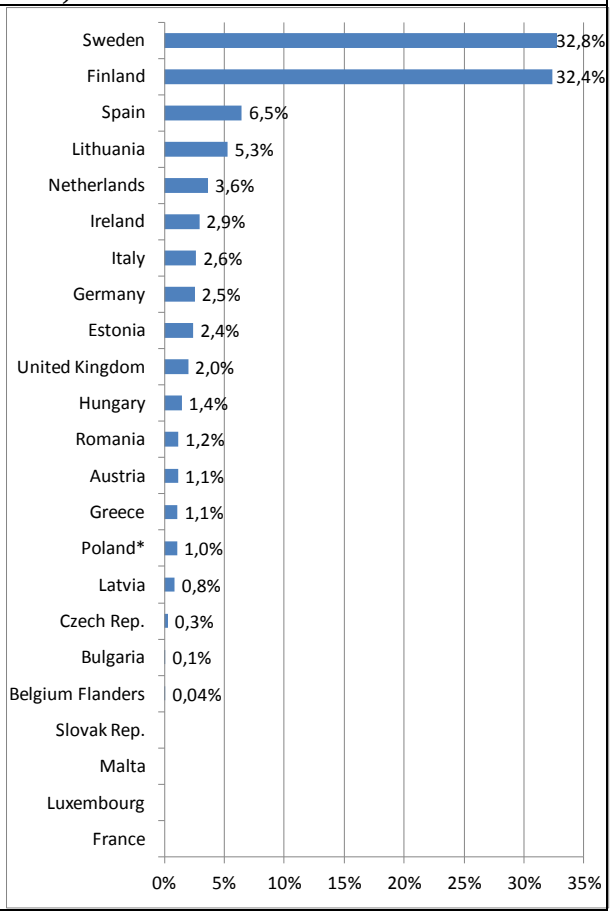
Naturally characterised by clear water, these systems have frequently shifted into turbid, phytoplankton-dominated states lacking macrophytes, primarily caused by nutrient pollution (eutrophication). Climate change may exacerbate eutrophication symptoms, with warmer summers resulting in increased phytoplankton growth, enhanced nutrient release from the sediment and potentially favouring invasive plant and fish species.

Deep lakes are mainly found in mountainous regions and under natural conditions they are characterised by very low nutrient loads. Macrophytes are restricted to a narrow belt along the shores and phytoplankton abundance is low. Even the deep zones are well oxygenated throughout the year and provide high quality habitat for benthic invertebrates and cold water adapted fish. The main human impacts are acidification, eutrophication and management of water level regimes.

Eutrophication in deep lakes causes enhanced primary production by phytoplankton, in severe cases algal blooms and oxygen depletion (particularly in the deep zones) may affect all processes and species. The main physical effects of warming are a longer and more intense stratification period. This stratification of the water body during summer into warm surface water and cold deep water can result in accelerated oxygen depletion of the deep zones in more enriched deep lakes.

Twenty Member States have reported lake water bodies. In total around 17 500 lake WBs with an area greater than 80 000 km2 has been reported by MS,. Two countries, Sweden, and Finland, reported more than two thirds of the lake WBs and lake area.

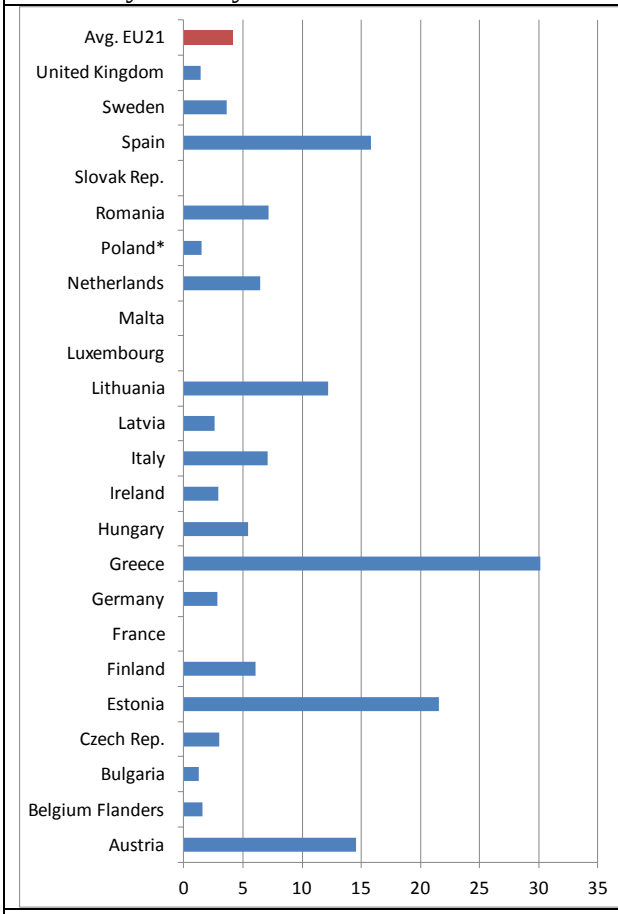
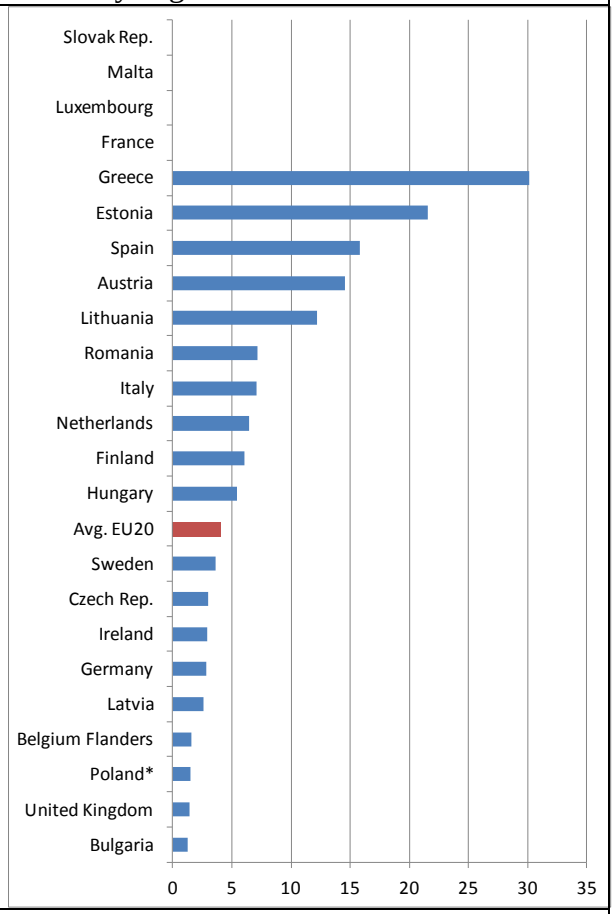
Figure X: Percentage lake WBs and area of lakes per country

Sorted by percentage of lake WBs (total 17 477)	Sorted percentage of lake area (total 80 200 km2)
	

The average size/area of the more than 17 000 reported lake WBs is 4 km2. Five MS had average size of lake WBs greater than 10 km^2.

Lake water bodies for large lakes <text missing>

Figure X: Average area of lake water bodies (km2 per lake WB)

Sorted by country	Sorted by avg. area of lake WBs
	
	Note: Area of lakes for France looks wrong No lakes reported for Slovak Rep. Malta, and Luxembourg. Greece maybe wrong?

5.2.3. Transitional water bodies

Fifteen Member States reported from 77 RBDs transitional water bodies. In total 952 transitional WBs with an area greater than 13 000 km2 has been reported by MS,. Five countries, United Kingdom, Spain, France. Italy and Ireland, reported more than 90 % of the transitional WBs and more than 70 % of transitional area.

Category	Member States	RBDs	Number of water bodies	Length or area
Trans tional	15	77	952	13 200 km^2

Source: WISER http://www.wiser.eu/background/transitional-waters/

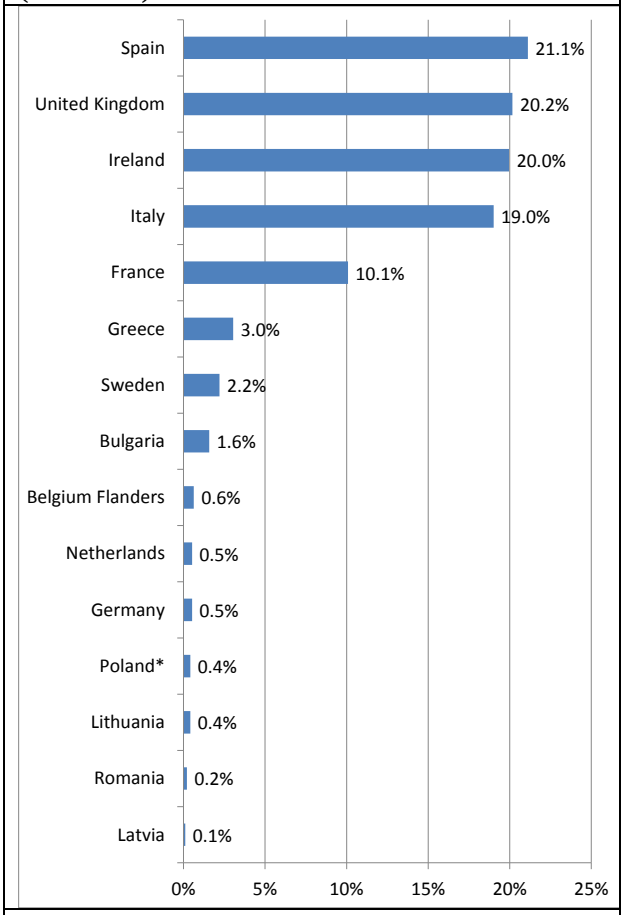
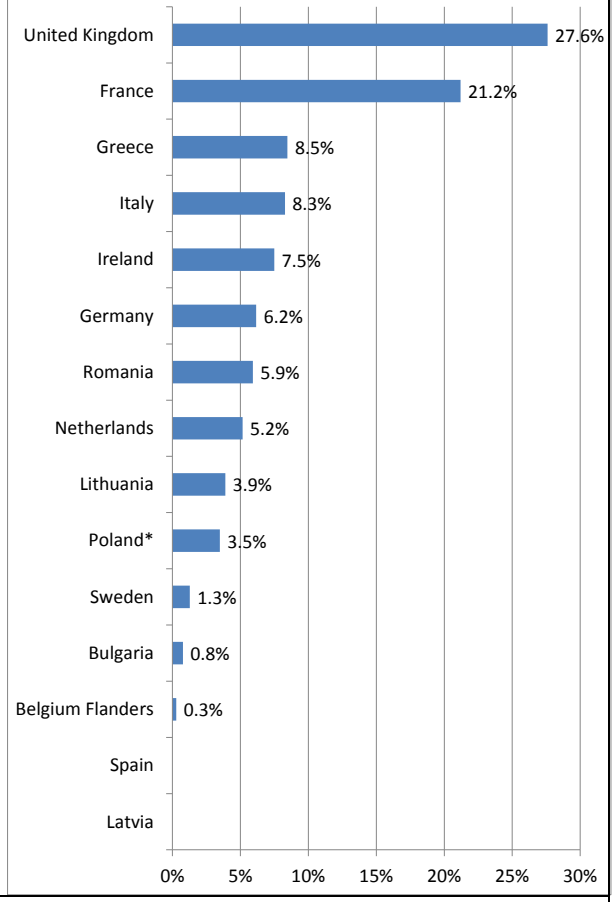
Transitional waters are those waters between the land and the sea and include fjords, estuaries, lagoons, deltas and rias. They often encompass river mouths and so show the transition from freshwater to marine conditions. Depending on the tidal influence from

coastal waters, but also on the freshwater influence from upstream, transitional waters are often characterised by frequently changing salinity.

These hydrographic features often relate to tides and freshwater and marine conditions which make transitional waters highly dynamic and create a particular and characteristic flora and fauna.

Transitional waters are the sites of major cities and ports, for example in Europe this includes London, Hamburg, Antwerp, Rotterdam, Nantes, Lisbon and Bilbao. Because of this these waters historically have been degraded by port activities, by pollution from urban, industrial and agricultural areas, and by land claim for sea defences, building and agriculture.

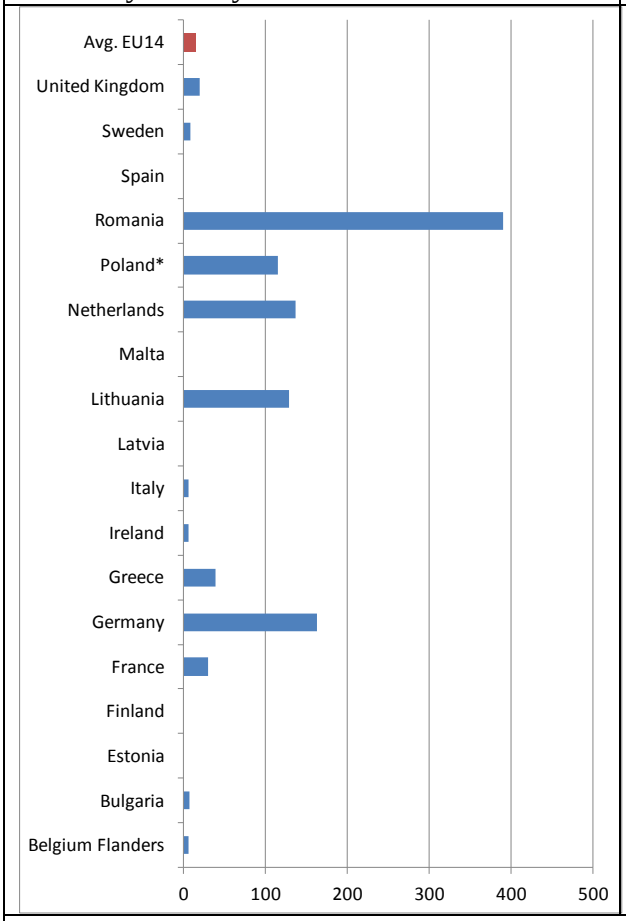
Figure X: Percentage transitional WBs and area of transitional waters per country

Sorted by percentage of transitional WBs (total 958)	Sorted percentage area of transitional waters (total 13 200 km2)
	
	Note: No/wrong area of transitional waters for Spain and Latvia. Estonia, Finland, and Malta have not reported transitional waters. Poland only transitional waters from PL6000 Oder RBD

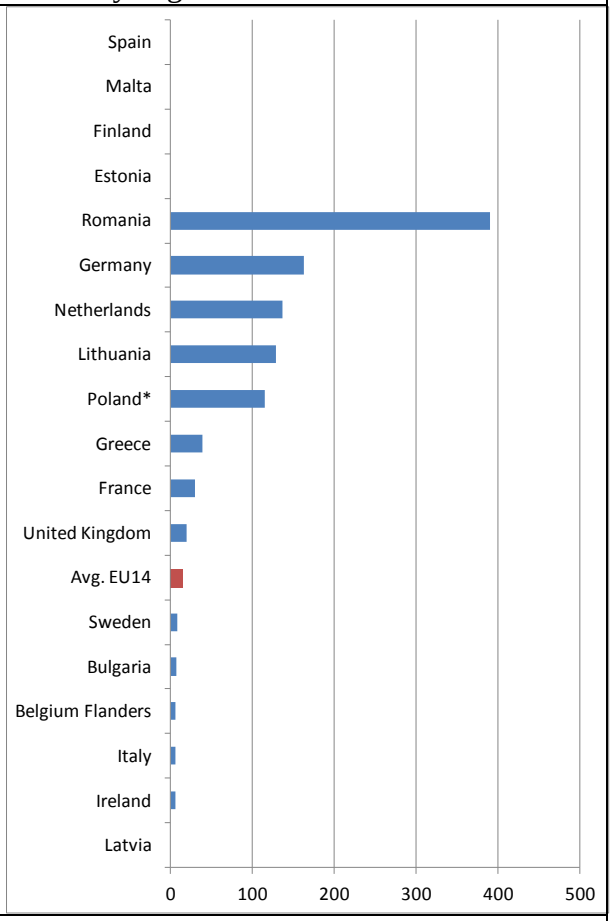
The average size/area of the reported transitional WBs is 14 km^2. Five MS had average size of transitional WBs greater than 100 km^2.

Figure X: Average area of transitional water bodies (km2 per transitional WB)

Sorted by country



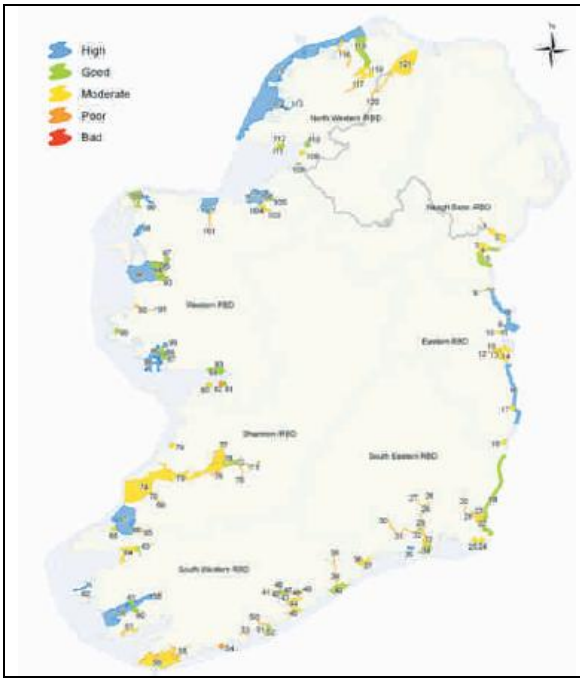
Sorted by avg. area of transitional WBs



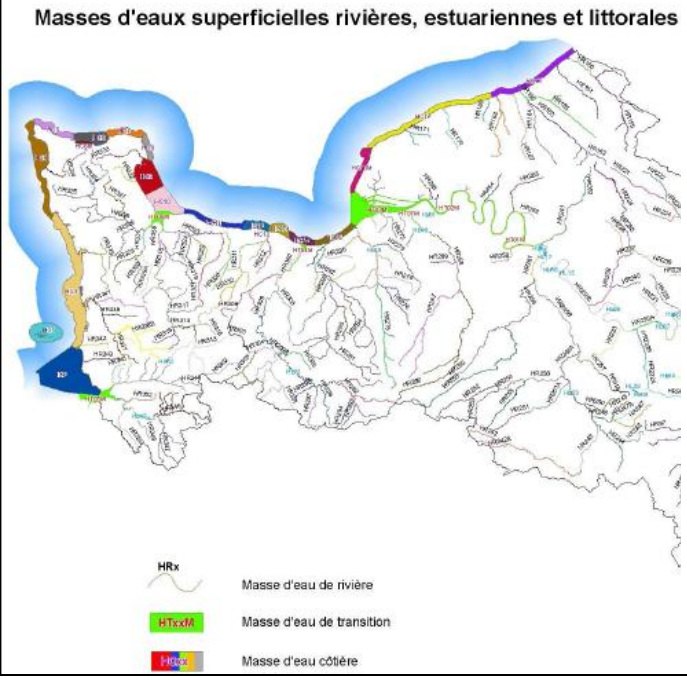
Note: No transitional WBs in Finland; Estonia, Malta – No area for one Latvian transitional WB –
Areas look wrong for Spain – maybe wrong for Romania

Examples of WFD/RBMP transitional water bodies
Ireland, DK, France, UK

Transitional and coastal waters in Ireland and the Seine and Normandie RBD



Ireland has identified 190 transitional WBs and 111 coastal WBs (not all have yet a classified ecological status)



Seine- Normandie district

5.2.4. Coastal water bodies

Category	Member States	RBDs	Number of water bodies	Length or area
Coastal waters	18	97	2774	267 600 km^2

Source: WISER http://www.wiser.eu/background/coastal-waters/

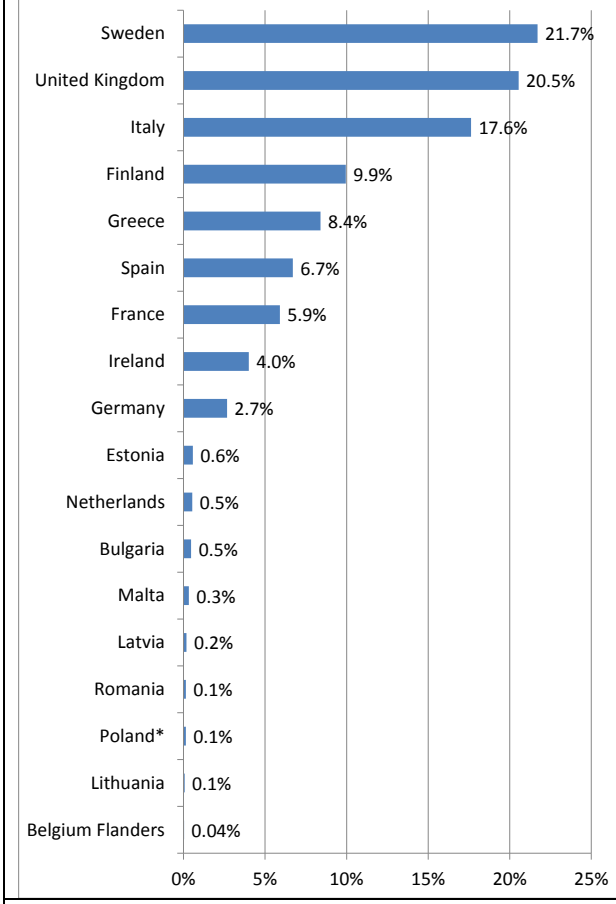
Coastal waters represent the interface between land and ocean, and in the context of the Water Framework Directive coastal waters include water, that has not been designated as transitional water, extending one nautical mile from a baseline defined by the land points where territorial waters are measured. Like in transitional waters, freshwater mixes with ocean water in the coastal zone but the mixing occurs more widespread along the coast as opposed to transitional waters dominated by strong gradients from the freshwater source to the sea end-member. Transitional and coastal waters belong to the most productive ecosystems in the world.

European coastal waters encompasses subtropical over temporal to boreal waters, and the long coastline of the Atlantic Ocean, North Sea, Baltic Sea, Mediterranean Sea and Black Sea represents the largest water mass in relation to the Water Framework Directive.

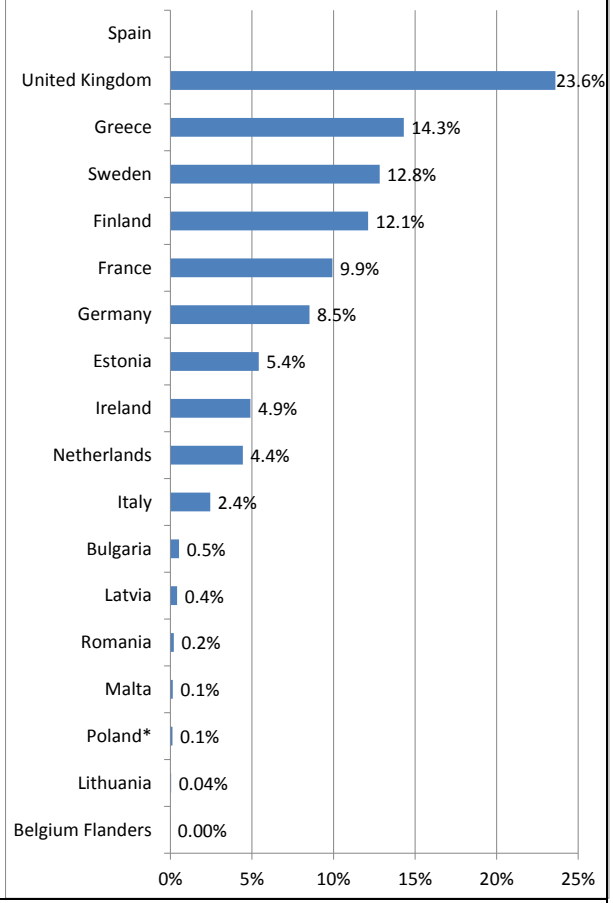
All European coastal waters have, to a varying degree, been affected by eutrophication and this has led to nuisance and toxic algal blooms, loss of benthic habitats by shading out benthic vegetation and eradication of benthic fauna due to oxygen depletion as well as fish kills. Pollution transport between coastal water bodies, transitional waters and across the interface to the open sea implies a pan-European effort to combat eutrophication and restore coastal ecosystems.

Figure X: Percentage coastal WBs and area of coastal waters per country

Sorted by percentage of coastal WBs (total 2774)



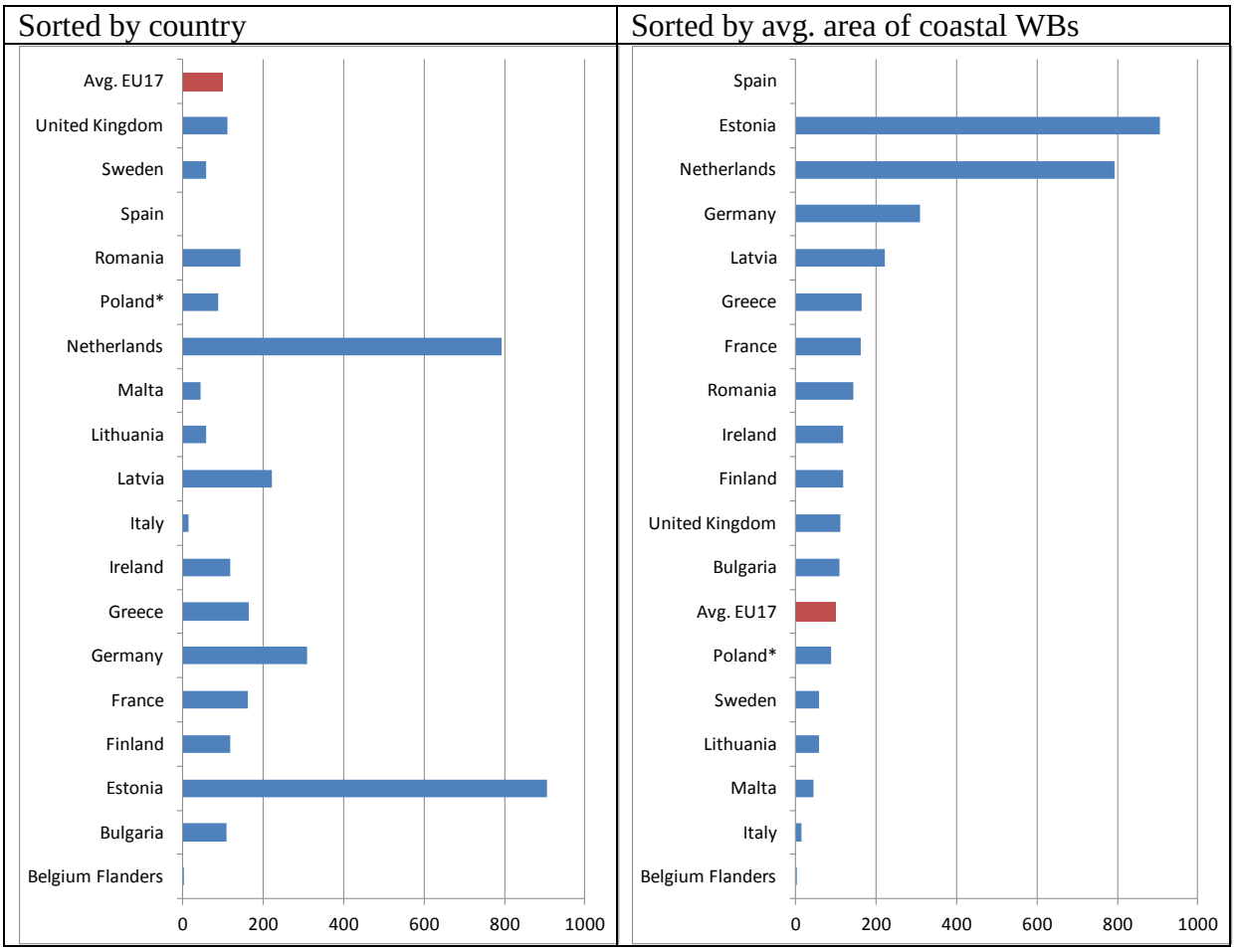
Sorted percentage area of coastal waters (total 267 600 km2)



Note: Wrong area of Spanish coastal waters

The average size/area of the reported coastal WBs is 97 km^2. Two MS, Estonia and the Netherlands, had average size of coastal WBs greater than 700 km^2.

Figure X: Average area of coastal water bodies (km2 per coastal WB)



5.3. Small surface water bodies

The WFD applies to all waters, but Annex 5 of the Directive sets size thresholds to identify river and lake water bodies, which are 10 km^2 for stream catchment area and 0.5 km^2 for the surface area of lakes. These thresholds have generally been used by Member States to define what is termed the baseline set of freshwater water bodies. In addition, small water bodies may be identified.

Text missing

See http://www.wfduk.org/tag_guidance/Article_05/Folder.2004-02-16.5420/TAG%202003%20WP%203a%20%28PR02%29

The Common Implementation Strategy (CIS) Horizontal Guidance on Water Bodies establishes a common framework for the identification of small surface water bodies.

Text box: EU Common Implementation Strategy guidance on the selective identification of small water bodies (Ref. WFD guidance #2)

"The purpose of the Directive is to establish a framework for the protection of **all waters**

including inland surface waters, transitional waters, coastal waters and groundwater. Member States must ensure that the implementation of the Directive's provisions achieves this purpose. However, surface waters include a large number of very small waters for which the administrative burden for the management of these waters may be enormous."

"The Directive does not include a threshold for very small "water bodies". However, the Directive sets out two systems for differentiating water bodies into types2, System A and System B. Only the System A typology specifies values for size descriptors for rivers and lakes. The smallest size range for a System A river type is 10 – 100 km2 catchment area. The smallest size range for a System A lake type is 0.5 – 1 km2 surface area4. No sizes for small transitional and coastal waters are given. The application of system B must achieve, at least, the same level of differentiation as system A. It is therefore recommended to use the size of small rivers and lakes according to system A. However, it is recognised that in some regions where there are many small water bodies, this general approach will need to be adapted. Having said that, it may be appropriate to aggregate water bodies into groups for certain purposes as outlined in chapter 5 in order to avoid unnecessary administrative burden."

"However, there are still large numbers of discrete rivers and lakes that are smaller than these thresholds. A possible approach for the protection of these waters is outlined below."

"**Member States have flexibility to decide whether the purposes of the Directive, which apply to all surface waters, can be achieved without the identification of every minor but discrete and significant element of surface water as a water body.**"

5.4. Groundwater bodies

Missing – only old text – Groundwater will have a separate assessment
The size of the groundwater bodies range is most Member States between 300 km2 and 1000 km2. Denmark and Ireland, Malta, the Netherlands and Sweden have identified small groundwater bodies in comparison to the other Member States. The average size of groundwater bodies is 900 km2 (see Figure 4).

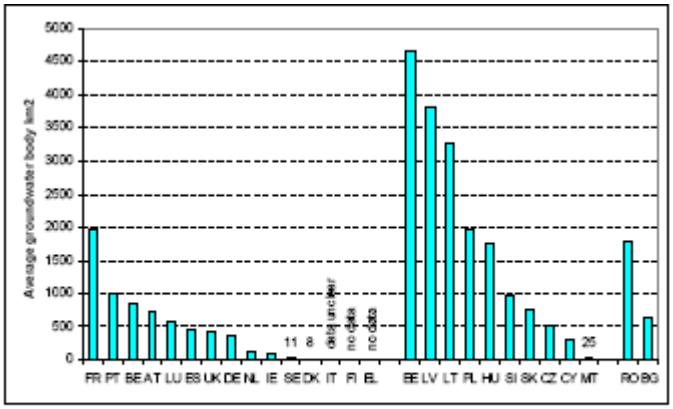


Figure 4: Average size of groundwater bodies

Notes for Figure 4:

6. Artificial and heavily modified water bodies

The WFD recognises that human society has changed the hydromorphology of the water environment to provide certain functions or uses. For example, artificial reservoirs have been built and used for drinking water supply. Rivers have been altered to reduce the risk of flooding. Restoring the hydromorphology of such water bodies to good ecological status, as defined in the WFD, may have a significant impact on these uses. If this is the case, the WFD allows us to designate the water body as artificial or heavily modified.

Under certain conditions, Member States may designate a body of surface water as artificial or heavily modified.

- Artificial water bodies describe water bodies that are entirely man-made for example ponds and canals. They also include lakes where no significant water body existed previously (gravel pits) or impounded rivers or lakes with an artificial catchment (reservoirs).

- A heavily modified water body is an existing body of water that has had its original appearance significantly changed to suit a specific purpose. For example, a river water body that has undergone extensive re-alignment for navigation, or a flood defended coastline.

Heavily Modified Water Bodies (HMWBs) are defined according to two key criteria. First, they must have been substantially changed in character as a result of significant physical alterations by human activity. Second, the alterations must still be providing socio-economic benefits that it would be too expensive and/or technically infeasible to provide in any other fashion. If met, these conditions mean that it is not possible for the water body to meet good ecological status.

'Human activities' are defined as navigation (port facilities, transport or recreation), activities for the purposes of which water is stored in reservoirs (such as drinking-water supply, power generation or irrigation), water regulation, flood protection and land drainage. In addition, urban …

Good ecological potential
Instead of good ecological status, the environmental objective for HMWB/AWB is good ecological potential (GEP), which has to be achieved by 2015. GEP is the best ecology that the water body can achieve without compromising what it is used for. The designation is not an opportunity to avoid achieving demanding ecological and chemical objectives, since good ecological potential is an ecological objective which may often, in itself, be challenging to achieve.

GEF takes account of the modifications to a water body to maintain its use. An AWB/HMWB is at GEP when the hydromorphological characteristics have been improved to the fullest extent, but without a significantly adverse impact on use or the wider environment.

6.1. European overview

Main results from thematic assessment on hydromorphology to be included here

7. Pressures and impact analysis

7.1. Introduction

Below text to be revised and condensed
The pressure and impact analysis reviews the impact of human activity on surface waters and on groundwaters and identifies those water bodies that are at risk of failing to meet the Directive's environmental objectives.

The central question of the pressure and impact analysis is 'which water bodies are at risk of failing the environmental objectives set out in the Directive?' Therefore, throughout this report, 'at risk' means that:

- the pressure and impact assessment shows that there is a likelihood that a water body will fail to meet the Directive's environmental objectives by 2015 unless appropriate management action is taken.

"At risk" does not necessarily mean that the water bodies are already suffering poor status, but it does highlight areas where appropriate management actions should be applied to ensure that good status is maintained or to ensure it is achieved in the future.

Published in 2005, the WFD Article 5: Characterisation and impacts analyses reports were the first step in identifying pressures and impacts in the RBM planning process.
In 2007/08 the Significant Water Management Issues (SWMI) reports were the basis ....

Significant water management issues – significant pressures

The significant water management issues are the pressures acting on the water environment that we think put our ability to achieve the environmental objectives of the Water Framework Directive most at risk.
Issues may arise from:

- ongoing human activity (e.g. farming, abstraction);
- historic human activity (e.g. abandoned mines, contaminated land);
- new development (e.g. increasing demand for drinking water supplies).

The significant issues vary across the geographical extent of Europe due to the differences in land characteristics, intensive agriculture and population density. In rural areas, the significant issues tend to relate to sectors such as agriculture, water supply and hydropower. In densely populated areas the significant issues tend to be related to discharge of pollutants and urban development.

General introduction to pressures and impacts

One major problem affecting the water environment is **pollution.** Pollution is harmful to aquatic plants and animals, and may threaten drinking water and industrial water supplies. Pollution can be anything from a poisonous metal or pesticide to a nutrient which can choke waters with excessive weed growth, or even silt that can smother fish spawning beds.
Pollution comes from one of two types of source:

- **point sources**, e.g. pipes discharging effluents from industrial sites, wastewater treatment plants or mines; and

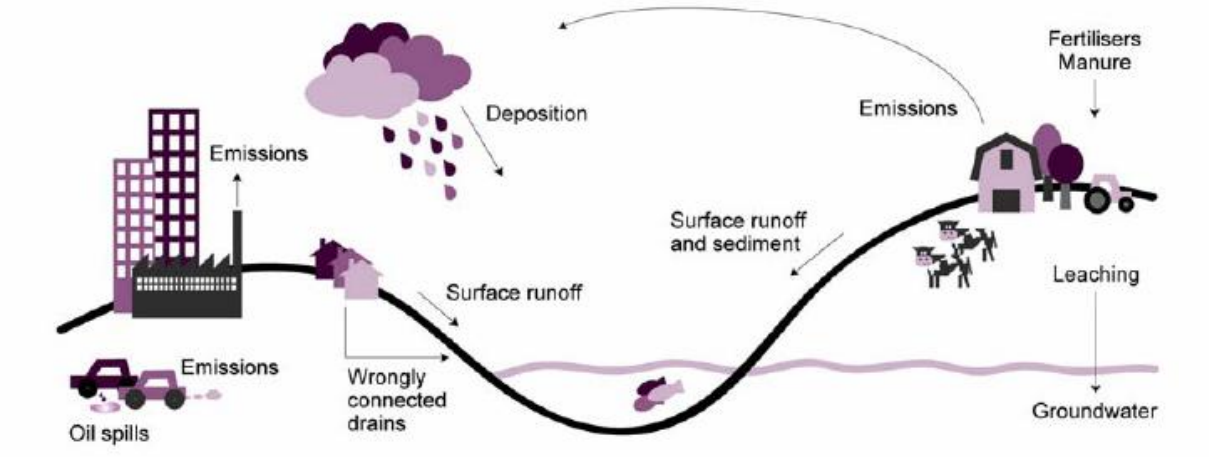
- **diffuse sources**, e.g. land use activities such as farming, forestry and urban areas.

Diffuse water pollution is a serious problem in many parts of Europe. It represents a widespread and long-term threat to the ecology of lakes, rivers and coastal waters, and to the quality of groundwater. Diffuse sources of pollution include run-off from farmland, run-off from roads or scattered dwellings. Diffuse pollution is closely linked to land use (e.g. the application of fertiliser or pesticides to farmland; livestock manure; use of chemicals and leakage from old waste storage and polluted industrial sites). Diffuse pollution is also linked to air emissions, for example acid rain or deposition of nitrogen, impacts of traffic emissions or other air transported pollutants.

Some of the main impacts related to diffuse pollution are

- high levels of nutrients in rivers, lakes, estuaries and coastal waters, which can cause eutrophication;
- nitrate contamination of water used for drinking water;
- hazardous chemicals leaking into rivers, lakes and groundwater from industrial sites;
- air pollution causing acid rain, deposition of nitrogen on sensitive waters and deposition of hazardous chemicals (e.g. mercury and PAHs)
- pesticides and sheep dip from agriculture entering rivers, lakes and groundwater;
- oxygen depletion in water due to organic pollution from livestock manure;
- sediments from soil erosion smothering habitats in rivers, lakes and estuaries;
- bacteriological contamination of bathing waters and shellfish waters from farm waste and untreated wastewater.

Figure 1
Common sources of diffuse pollution



Source: EA 2007 http://www.environment-agency.gov.uk/static/documents/Research/geho0207bzlvee_1773088.pdf

Diffuse agricultural pollution arises from land use activities such as livestock grazing and cultivation of land to grow crops and from farm steading run-off. Such activities can give rise to a release of potential pollutants.
Diffuse pollution from agriculture is a significant pressure for groundwater, rivers, lakes, transitional and coastal waters. It is estimated that nearly xx% those water bodies at risk of failing to meet the environmental objectives of the Water Framework Directive are affected by diffuse pollution from agriculture.

Main impacts

- Losses of nutrients from fertilisers, animal manures and slurries applied to land can result in excessive plant growth. This in turn results in eutrophication in lakes, large slowly flowing rivers, transitional and coastal waters.
- Organic matter from animal waste and products (e.g. silage) removes oxygen from rivers, damaging plant and animal life.
- Soil erosion can smother gravels in rivers and lakes, and reduce light penetration in estuaries and coastal waters.

Urban sewage is a mixture of wastewater from households and industries. Over the last 25 years the wastewater treatment has progressively improved and in many parts of Europe a large proportion of the pollutants are today removed. However, pollution caused by inadequately treated sewage is the second most important source of river pollution and the most important for transitional and coastal waters. Of Scotland's river, transitional and coastal water bodies at risk of failing to meet the Water Framework Directive's environmental objectives, over a third are affected by point source pollution from the collection and treatment of sewage activities.

Industrial discharges

Aquaculture

Discharge of polluting waters from disused **mines** became an environmental problem with the closure of many mines over the last fifty. The cessation or reduction of groundwater pumping when deep mines closed resulted in the rebound of groundwater within the abandoned workings.
Approximately 30% of Scotland's groundwater bodies at risk of failing to meet the environmental objectives of the Water Framework Directive are affected by pollution from mining and quarrying.

The **abstraction** of too much water from rivers, lakes or groundwater is harmful to the environment and can compromise the water resources needed by other water users. Water abstraction may reduce the amount of water available to dilute discharges and therefore makes pollution worse. In extreme cases, rivers and reservoirs can dry up or salt water can be drawn into groundwater. Transfers of water from one catchment to another and flow-controlling structures, such as dams may also have major influences on water flows.

Morphology is the physical structure of a river, loch, estuary or coast including, for example, the banks and bed of a river and the shore of lochs or coastal waters. Engineering or the way the land is managed can change the morphology of these waters. This has a direct impact on animals and plants and can lead to increased flooding or erosion.

Land reclamation, shoreline reinforcement or physical barriers (such as flood defences, barrages and sluices) can affect all categories of surface waters. Weirs, dams and barrages can alter water and sediment movements, and may impede the passage of migratory fish such as salmon. Using water for transport and recreation often requires physical alteration to habitats and affects the flow of water. Activities such as maintenance and aggregate dredging and commercial fishing using towed bottom-fishing gear can also damage physical habitats.

Invasive alien species is an increasingly recognised issue. These are non-native plants or animals which compete with, and may even over-run, our natural aquatic plants and animals.

8. European overview

8.1. Overall status for all four water categories

Overall, more than half (55 %) of the total number of reported and classified water bodies in Europe are in less than good ecological status/potential (figure 1.1). All these water bodies need management measures to restore their ecological status or potential to fulfil the WFD objective.

For rivers, there are 43000 water bodies (57% of the total number), or 540 000 km (65% of total river length) in less than good ecological status or potential. For lakes, the overall status is somewhat better than in rivers, but there are still almost 6000 lakes (43% of total number) or close to 30 000 km^2 (38% of total surface area) in less than good ecological status or potential. The reason why lakes are better than rivers is probably related to the large proportion of lakes in Sweden and Finland where the population density is low and there are large natural areas (boreal forests), while the rivers are more evenly distributed throughout Europe with a larger proportion of rivers in densely populated and cultivated areas in Central Europe.

The worst water category is transitional waters, where 68% of the total number or 84% of the total surface area is in less than good ecological status/potential. In coastal waters, the situation is somewhat better with 49% of total number or 36% of total surface area in less than good ecological status or potential. The reason why transitional waters are so much worse than coastal waters is probably related to the smaller volume of water in transitional waters, as well as their proximity to pollution sources being located at the mouth of rivers with high pollution loads. Moreover, transitional waters are exposed to extensive hydromorphological pressures caused by land reclamation, flood protection, as well as large harbours causing altered habitats in these water bodies.

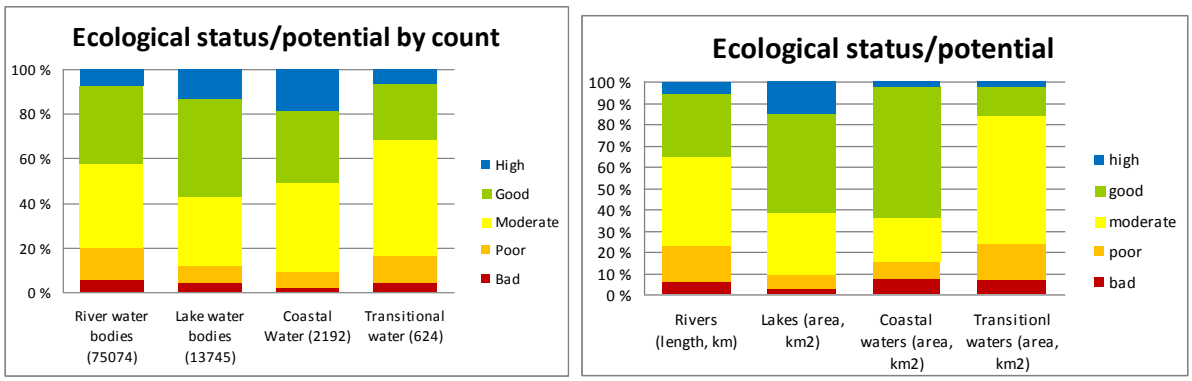


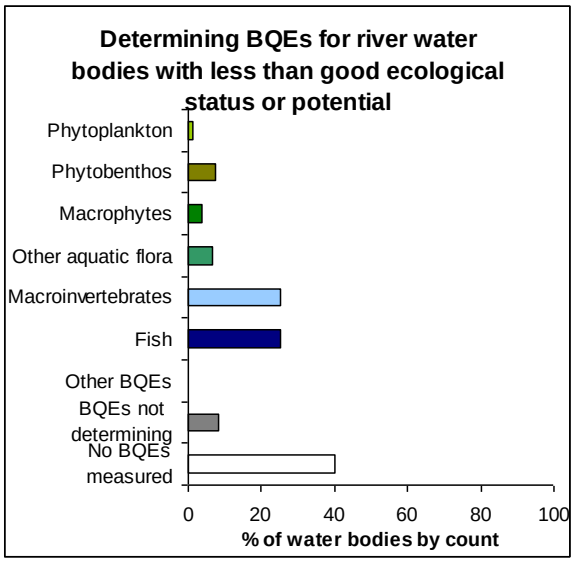
Figure 1.1.1 Distribution of ecological status/potential of classified EU rivers, lakes, coastal and transitional waters. Left panel shows the % of total number of water bodies, with the total number of water bodies for each water category given in brackets. Right panel shows the % of total length of rivers or surface area of lakes, coastal and transitional water).

Rivers and transitional waters are both worse as proportion of length or area than as proportion of total number (comparing the right and the left side of figure 1.1 for each water category), whereas for lakes and coastal waters the picture is opposite. This means that for

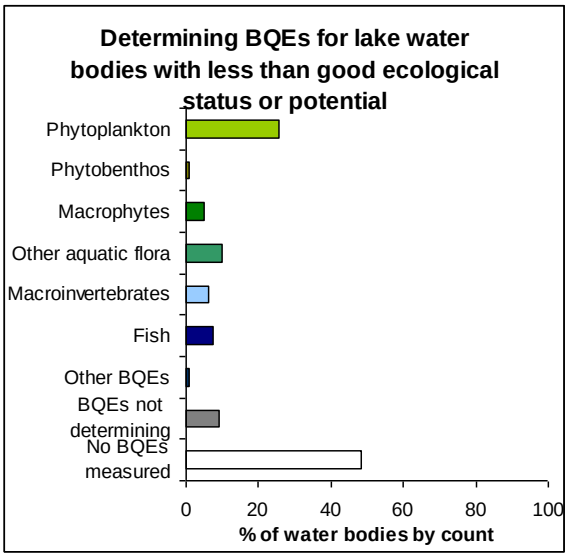
lakes and coastal waters the large water bodies are in general in better status than the smaller ones, whereas the largest rivers and transitional water bodies are in worse status than the smaller ones. The reason for this difference may be that the largest lakes and coastal waters have larger volumes of water and thus can tolerate more pressures than smaller water bodies, whereas the large rivers and transitional waters are located in areas with more pressures than the smaller ones.

Biological quality elements determining the ecological status class of water bodies in less than good ecological status or potential are presented in figure 1.1.2. In rivers, the macroinvertebrates (25%) and fish (25%) were most often determining the status class in those water bodies where any biological quality elements were measured, whereas in lakes, phytoplankton (25%) and other aquatic flora (10%) were most commonly determining the status class. As much as 40% of rivers and 48% of lakes in less than good status were classified without using any BQEs. The use of primarily fauna in rivers and flora in lakes for determining the status class may reflect the different dominant pressures and impacts in the two water categories and the different sensitivities to these pressures and impacts among the different quality elements. Both hydromorphological alterations, as well as organic enrichment from point sources are more common impacts in rivers than in lakes. These two pressures /impacts are normally considered to affect aquatic fauna more than aquatic flora. Additionally, the classification systems for lake fauna are less developed than for lake flora, and many countries did not have a fully developed classification system for macrophytes in rivers at the time of reporting.

a.) Rivers



b.) Lakes



c.) Transitional waters

d.) Coastal waters

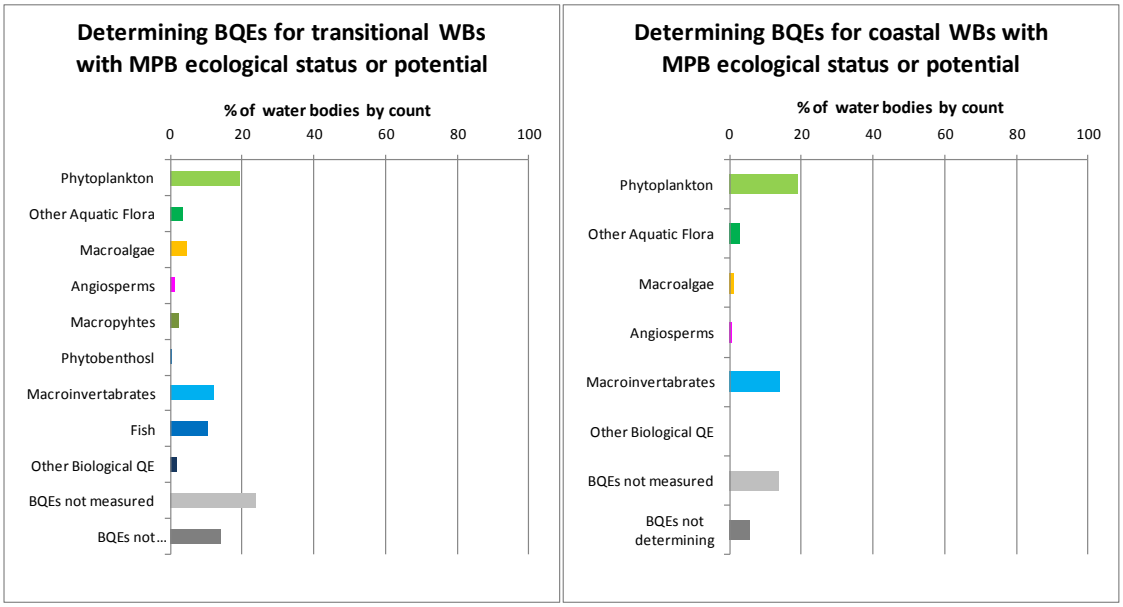


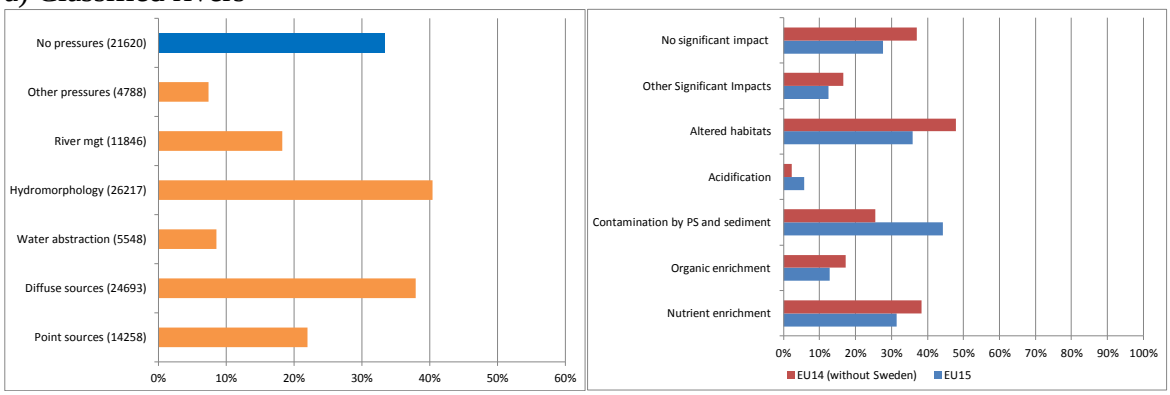
Figure 8.1.2 Biological quality elements used for classification of water bodies as percentage of total number of water bodies in less than good status, a: rivers, b: lakes, c: transitional waters, d) coastal waters. MPB means moderate, poor, bad. Excel sheet: TCW Quality elements.xls

Note: Figure and text below needs to be amended to show determining BQEs in less than good status WBs (as the plots and text for rivers and lakes above), not BQEs used in all classified WBs. Update to be done after the AG meeting 29.11.2011.

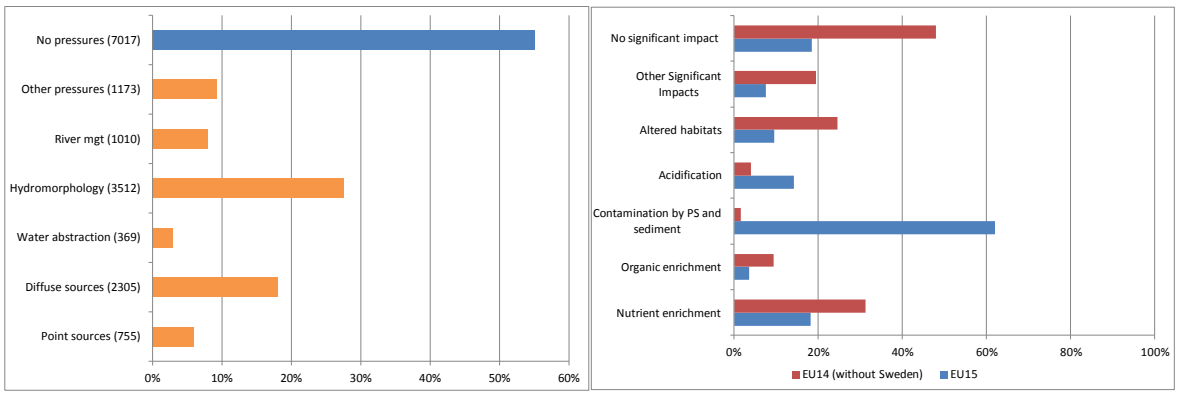
All biological elements were not used for classification in all coastal and transitional waters consistently. Use of BQEs in classification of bodies in less than good status (68% in transitional waters and 48% in coastal waters) was analysed. From all BQEs phytoplankton was used most often, followed by macro invertebrates. Accordingly the phytoplankton and macro invertebrates are most often the reason for classification in worse than good status, where phytoplankton is classified in less than good status in 19% and macro invertebrates in 14% for coastal waters and 12% in transitional waters. .Fish were used for classification of 10% of transitional waters. No BQEs were measured in ca. 20-25% of water bodies in less than good status for rivers, lakes and transitional waters. (Figure 1.1.2)

8.2. Pressures and impacts for all four water categories

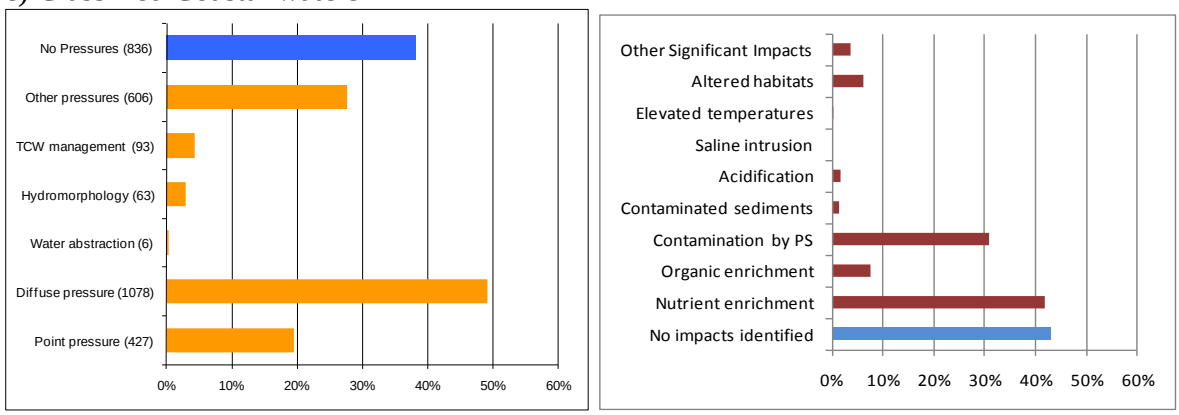
a) Classified rivers



b) Classified lakes



c) Classified Coastal waters



d) Classified Transitional waters

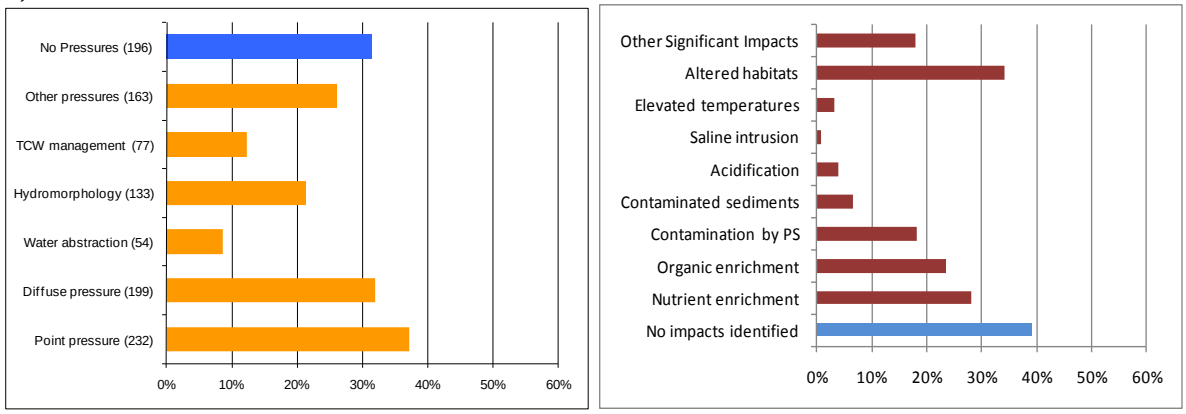


Figure 8.2.1. Percentage of total number of classified water bodies with identified significant pressures (left) and impacts (right) for a) rivers, b) lakes, c) coastal waters, d) transitional waters. For rivers and lakes the blue bars include Sweden and the red bars exclude Sweden. The diffuse pressures in rivers and lakes are shown after excluding the Swedish data on airborne contaminants (mercury).

Notes:
Rivers:
Pressures: Excel sheet: pressures_rivers (2).xlsx
Based on rWBs with classified ecological status, total 64866 water bodies from 18 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Latvia; Lithuania; Netherlands; Poland Oder; Spain*; Sweden & United Kingdom.
No pressure data from Ireland; Luxembourg; Romania & Slovak Rep.
For Sweden only include diffuse pressures related to agriculture, abandoned industrial and mining and population not connected to sewers,
Impacts:

Excel sheet: impact_rivers.xlsx
Notes: Based on rWBs with classified ecological status, total 61415 (incl. Sweden)/45940 water bodies from 15/14 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom.
Lakes:
Pressures:
Excel sheet: pressures_lakes.xlsx
Notes: Based on lWBs with classified ecological status total 12723 water bodies from 17 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Netherlands; Poland Oder; Spain*; Sweden & United Kingdom.
No pressure data from Ireland; Latvia; & Romania.
No lake data reported for: Luxembourg; & Slovak Rep.
For Sweden only include diffuse pressures related to agriculture, abandoned industrial and mining and population not connected to sewers,
Impacts:
Excel sheet: impact_lakes.xlsx
Notes: Based on lWBs with classified ecological status, total 11723 (incl. Sweden)/4527 water bodies from 15/14 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom.
No lake water bodies reported for Luxembourg and Slovak Rep.
Coastal waters:
Notes: There are 2774 reported coastal water bodies. 2192 of reported water bodies are classified, by 17 EU member states: Bulgaria, Germany, Estonia, Greece, Spain, Finland, France, Ireland, Italy, Lithuania, Latvia, Malta, Netherlands, Poland, Romania, Sweden, and United Kingdom.
No coastal waters in: Luxembourg; Slovak Rep., Czech Rep., Austria, Hungary
Pressures:
Excel sheet: TCW pressures.xls
Notes: based on classified ecological status, pressures for 1356 water bodies was reported from 17 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain
No pressures were reported for Romania
Impacts:
Excel sheet: TCW impacts.xls
Notes: based on classified ecological status, pressures for 1499 coastal water bodies was reported from 14 EU member states: Latvia, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain
No impacts were reported for: Netherlands, Romania and Poland.
Transitional waters:
Notes: There are 952 reported transitional water bodies, 624 were reported as classified by 17 EU member states: Belgium Flanders, Bulgaria, Germany, Greece, Spain, Finland, France, Ireland, Italy, Lithuania, Latvia, Malta, Netherlands, Poland, Romania, Sweden, United Kingdom.
No transitional waters in: Luxembourg; Slovak Rep., Czech Rep., Austria, Hungary, Finland, Estonia, Malta
Pressures:
Excel sheet: TCW pressures.xls
Notes: based on classified ecological status, pressures for 622 water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain
No pressures were reported for Romania
Only classified waters included
Impacts:
Excel sheet: TCW impacts.xls
Notes: based on classified ecological status, impacts were reported for 613 transitional water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain
No pressures were reported for Romania, Poland, and Netherlands

The main pressures in European waters are diffuse and point source pollution, as well as hydromorphological alterations, the latter is less important in coastal waters (figure 1.2.1). The unidentified pressure category called “other pressures” is most important in coastal and transitional waters. These “other pressures” could be a combination of different pressures, such as invasive species and other unidentified pressures. In all water categories except lakes the proportion of water bodies with no significant pressures reported varies between 20-40%, meaning that between 60-80% of all water bodies are subject to one or more significant

pressures in these water categories. For lakes there are more water bodies without pressures (55%) than in the other water categories, probably because most lakes are located in Northern Europe (Sweden and Finland) where population density is lower and there are more natural areas.

The diffuse source pollution as well as the contamination impacts are quite different depending on whether the data from Sweden is included or not. The reason is that Sweden has used the new EQS directive to classify the chemical status of their water bodies and has found that virtually all water bodies are in less than good status due to mercury in fish, and that airborne pollution of contaminants, primarily mercury, is occurring in all their water bodies. As this mercury pressure and impact may be less relevant for the ecological status, it is important to show the picture also without these data.

The most important impacts related to point and diffuse source pollution are nutrient enrichment, organic enrichment and contamination. Of these three impacts the most important is nutrient enrichment (eutrophication) in all water categories, except rivers, where altered habitats are a significant impact in more water bodies (close to 50% excl. SE). Organic enrichment is important in only 5-15% of water bodies in all the water categories. Contamination by priority substances and contaminated sediments seem also to be quite an important impact in all water categories except transitional waters, but this is mainly due to the Swedish reporting of mercury according to the EQS directive. If excluding Sweden, the contamination is still a significant impact affecting 25% of river water bodies with ecological status classification, but has considerably less impact in the other water categories. In water bodies with chemical status classification, the importance of contamination by priority substances is likely to be much higher in all water categories (*tbc by the chemical status and pressures background documents*).

8.3. Main assessment

More than half (55 %) of European water bodies are in less than good ecological status/potential, and thus need management measures to achieve the WFD objective. Rivers and transitional waters are generally in worse status than lakes and coastal waters.

The causes for the poor ecological status are emissions from diffuse and point sources coming from agricultural pollution, from urban waste water and industrial emissions, causing nutrient and organic enrichment, as well as hydromorphological changes causing altered habitats (the latter is less important in coastal waters). The hydromorphological pressures and impacts are further elaborated in a separate thematic assessment. The ecological status or potential in European rivers clearly deteriorate with increasing population density (figure 1.3.1).

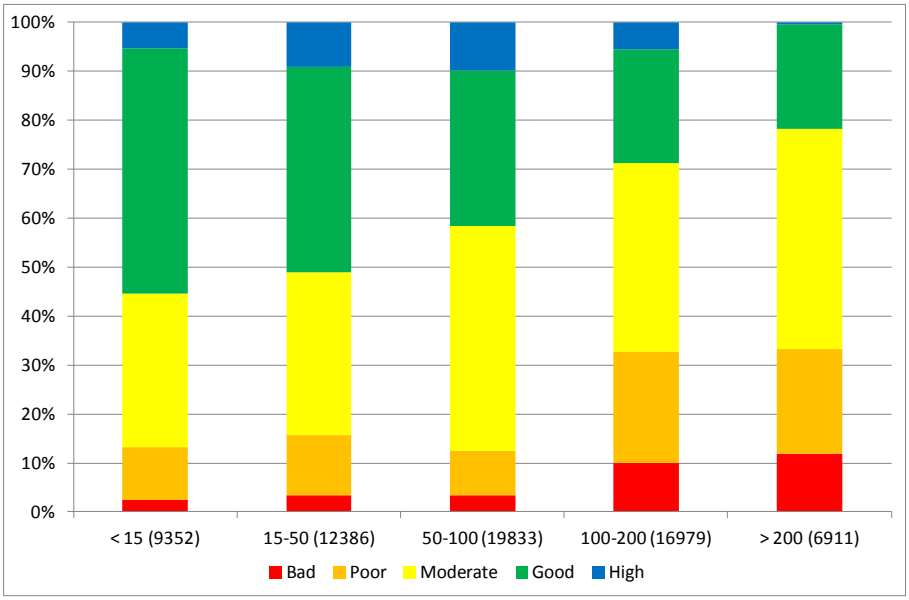
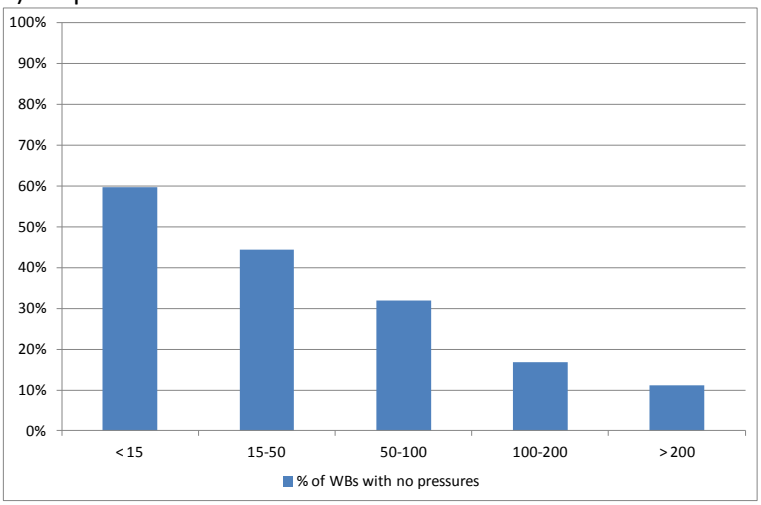


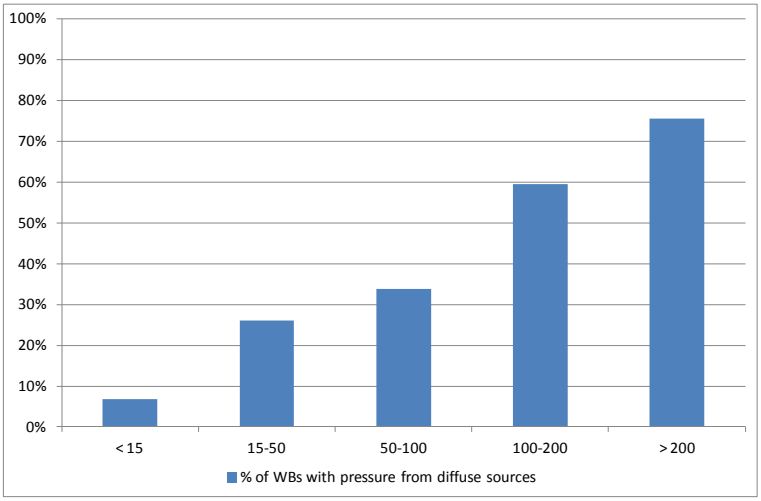
Figure 1.3.1. Relationship between Ecological status or potential of rivers as percentage of total number of rivers in different ecological status classes in different categories of population density given as a range of number of inhabitants/km2

Different levels of urbanisation are related to alterations of hydromorphology, as well as to extensive emissions of nutrients, organic substances and contaminants (priority substances and other national specific pollutants). Increasing population density is correlated with a clear decrease in the proportion of rivers with no pressures and with a clear increase in the proportion of rivers with diffuse source pollution, as well as with hydromorphological pressures (figure 1.3.2).

a) No pressures



b) diffuse sources pressures



c) hydromorphology pressures

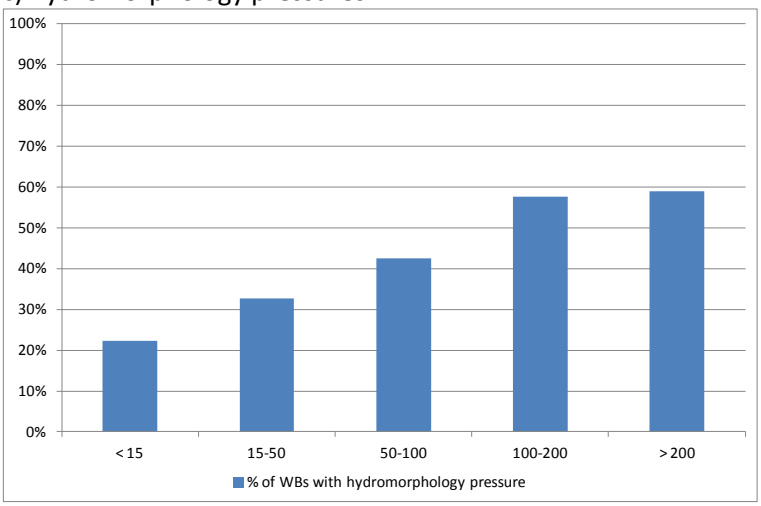


Figure 8.3.2. % river water bodies in population density groups (inh./km2) with a) no pressures, b) diffuse pressures and c) hydromorphology pressures

Additional figures showing the status, pressures and impacts as a function of intensive agriculture will be included in the next version.

Acidification caused by diffuse sources (long-range transboundary air pollution) is impacting only 15% of classified and reported lakes and ca. 6% of rivers, reflecting the reduced emissions of SO2 from industries since the 80-ies (example from Norway to show this improving trend can be added).

Especially in coastal and transitional waters there are also other pressures affecting ca. 30% of all water bodies, although these are not further specified and are not reflected in the reporting of other impacts.

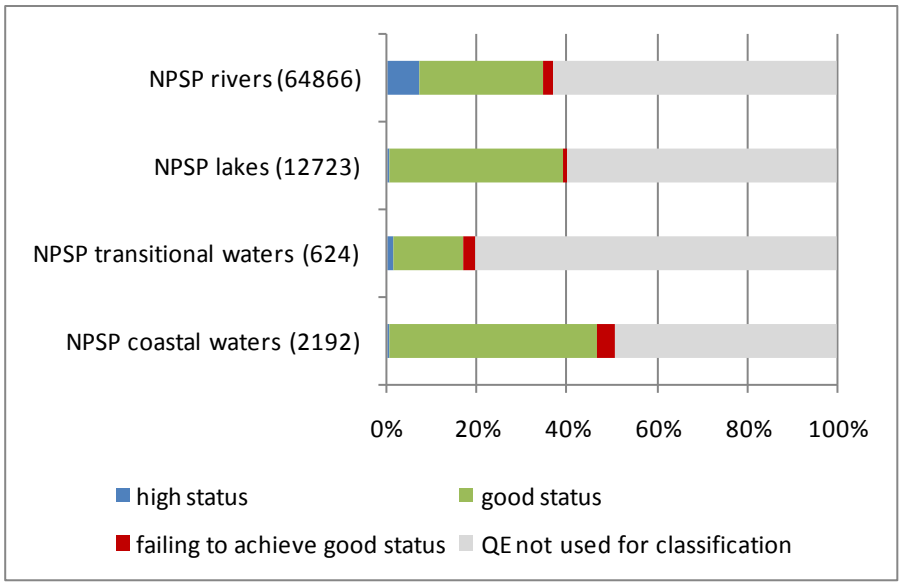


Figure 8.3.3. % water bodies in different status classes for non-priority pollutants for rivers, lakes, transitional and coastal waters

Contamination with priority substances from point and diffuse sources mainly affects chemical status, which is not elaborated in this report (EEA Chemicals report 2012[3]). The contamination from non-priority substances affects less than 5% of water bodies in less than good ecological status in all four water categories This indicates that non-priority substances (national specific pollutants) are apparently not an important impact on the ecological status in water bodies. This is assumed to be due to the lack of reporting, which again may be caused by lack of knowledge and lack of limit values for relevant substances based on ecological responses.

Most of the information reported has low confidence due to incomplete assessment systems for ecological status, as well as unclear relationships between pressures/impacts and status, especially in coastal and transitional waters.

[3] Hazardous substances in Europe's fresh and marine waters — An overview http://www.eea.europa.eu/publications/hazardous-substances-in-europes-fresh

9. Regional overview

9.1. Overall status for rivers, transitional and coastal waters in different sea regions

The sea region delineation used for this assessment is done according to the Marine Strategy Framework Directive (MSFD) Article 4, with the Arctic Ocean added as a separate region (figure 2.1.1). As the land area draining into what is defined as the North-East Atlantic region of the MSFD is very big, it was decided rather to use the sub-region level here, but merging the Celtic Seas, the Bay of Biscay and the Iberian Coast.

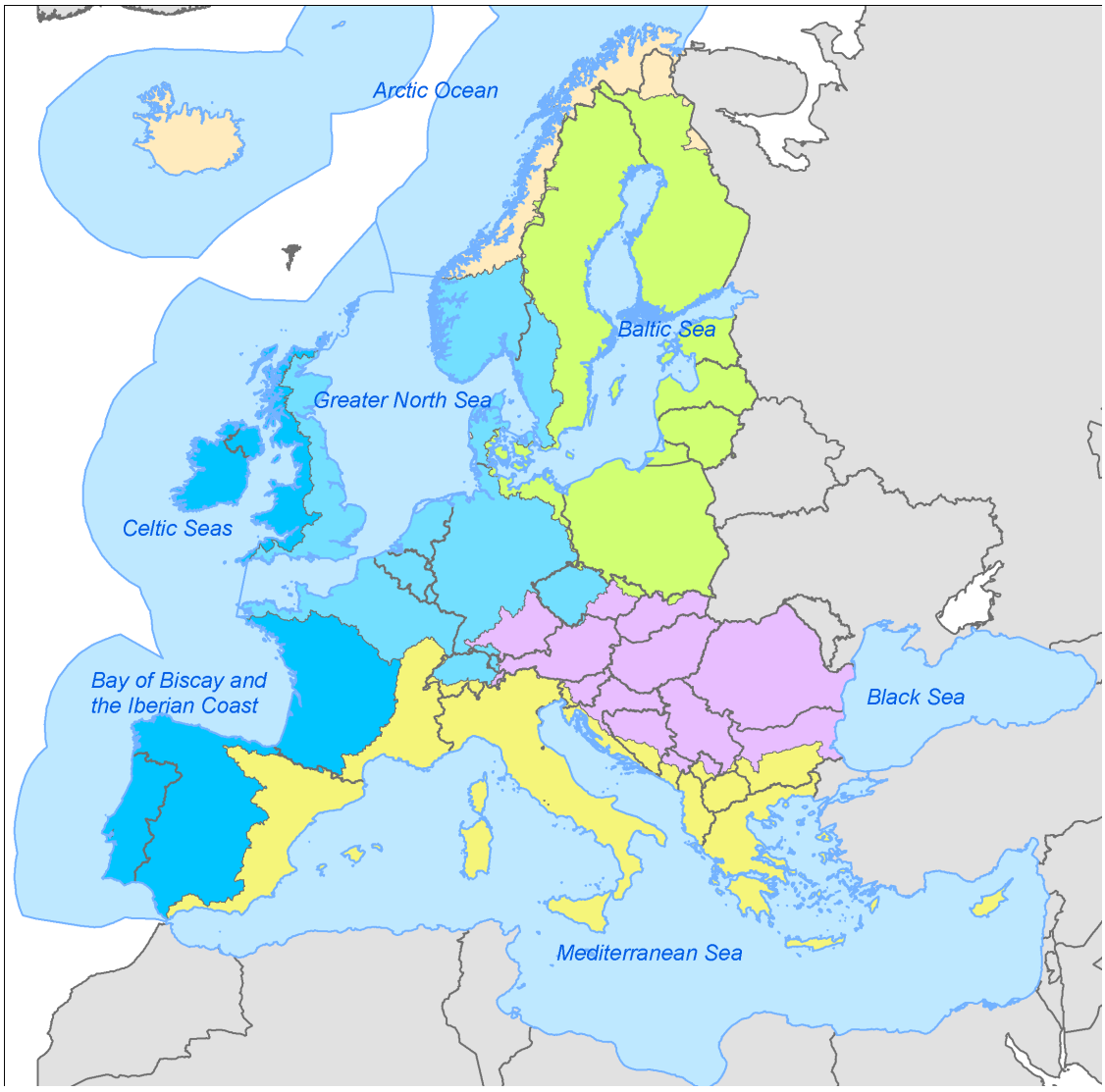


Figure 9.1.1: Delineation of land areas draining into the six different seas. This is the basis for the sea region aggregation in the other figures in this chapter.

The rivers draining to the Greater North Sea have the worst ecological status compared to rivers draining to other sea regions with ca. 80% of the water bodies in less than good status

(figure 2.1.2). For the other major sea regions, except the Arctic Sea, ca. 50% of the rivers water bodies have less than good status.

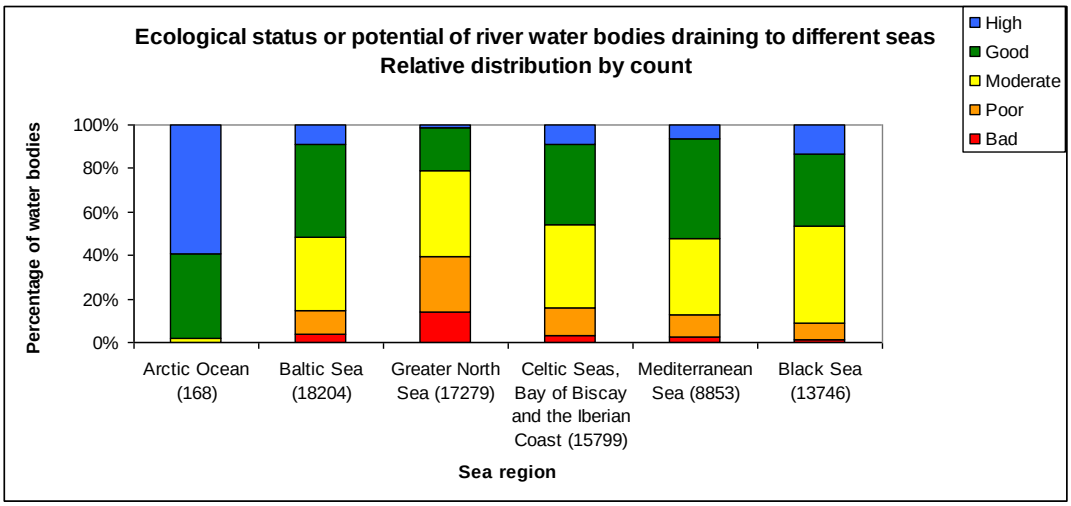


Figure 2.1.2 Ecological status or potential for rivers draining to different sea regions given as percentage of total number of classified river water bodies in different ecological status classes. The total number of classified river water bodies draining to each of the sea regions is given in brackets.

All transitional waters in the Baltic Sea region are in less than good status. Most of transitional waters in EU part of Black Sea (85%) are also in less than good status (figure 2.1.3). This part represents only small portion of Black sea, mainly in the Danube delta. The best ecological status is in Celtic seas, Bay of Biscay and the Iberian coast with close to 60% of water bodies in less than good status.

80% of coastal waters in the Baltic region are in less than good status (figure 2.1.4). Only 15% of water bodies are in less than good status in the Celtic seas, Bay of Biscay and the Iberian coast. The proportion of water bodies in less than good status is also low in the Mediterranean (ca. 20%).

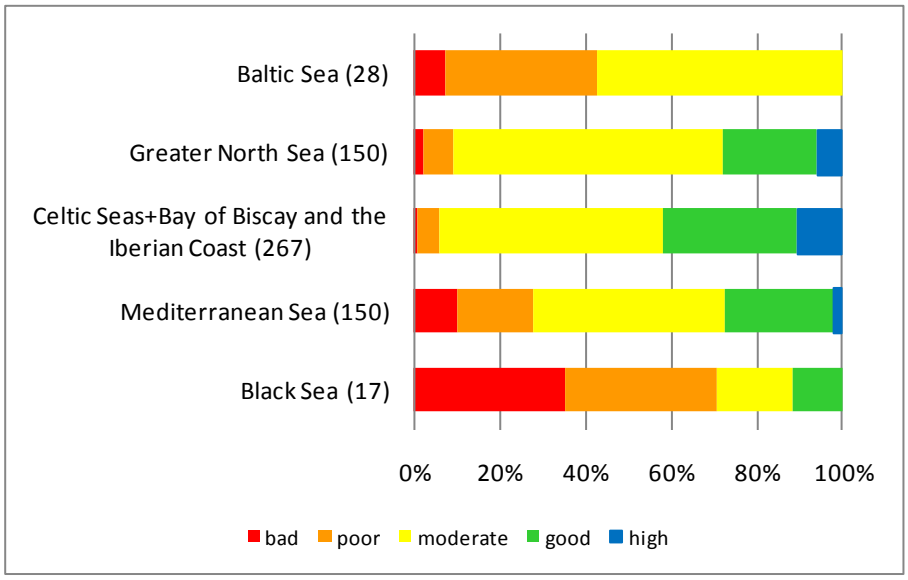


Figure 2.1.3 Ecological status or potential for transitional waters in different sea regions given as percentage of total number of classified water bodies in different ecological status classes. The total number of classified water bodies in each of the sea regions is given in brackets.

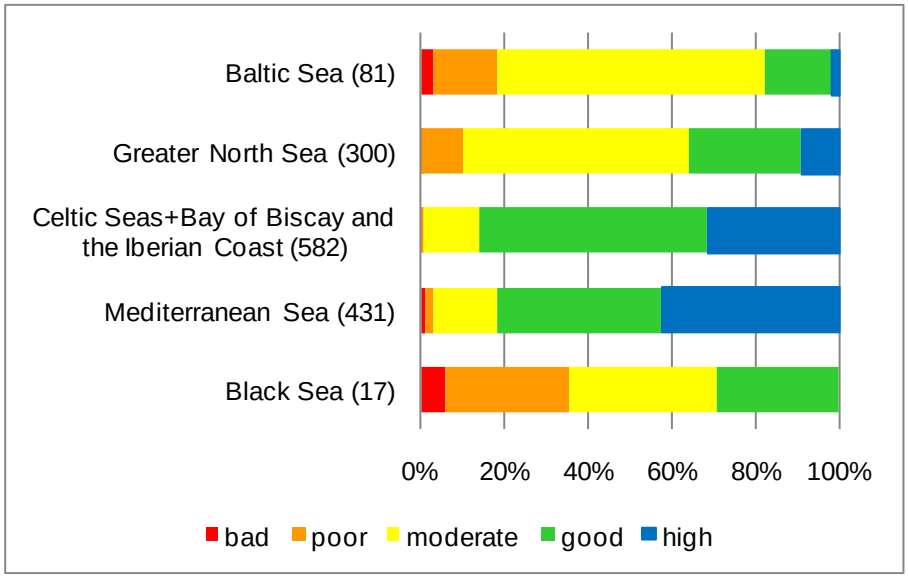


Figure 2.1.4. Ecological status or potential for coastal waters in different sea regions given as percentage of total number of classified water bodies in different ecological status classes. The total number of classified water bodies in each of the sea regions is given in brackets.

9.2. Pressures and impacts in rivers, transitional and coastal waters in different sea regions

a) Rivers

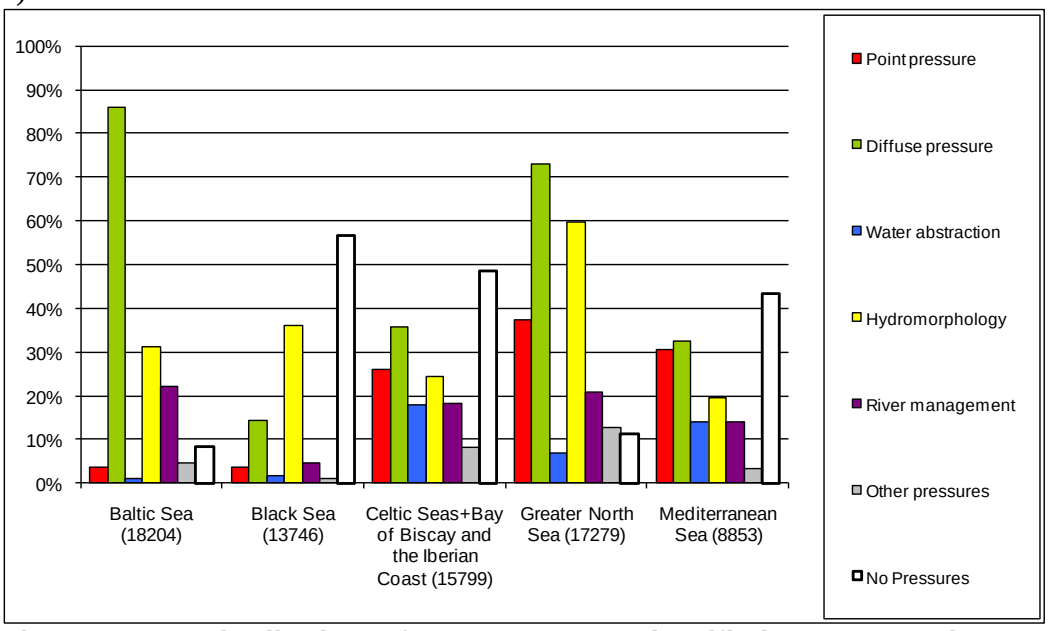


Figure 2.2.1. Distribution of pressures on classified European river water bodies draining to different seas, incl Sweden in the Baltic Sea.

Note: A new figure will be shown in next version after excluding Swedish diffuse pressure caused by mercury. Also the sea regions will be sorted to be equal to the impact figure for rivers (fig 2.2.2). Notes will also be included in next version.

The most severe pressures are found in rivers draining to the Greater North Sea, where diffuse source pollution and hydromorphological pressures are affecting the large majority of rivers (figure 2.2.1). Also point source pollution is highest in rivers draining to this sea region, with almost 40% of the rivers subjected to this pressure. Significant point source pollution is still occurring in also in rivers draining to the Mediterranean Sea and to the Celtic Sea, Bay of Biscay and Iberian Coast. For rivers draining to the Baltic Sea there is > 80% that are exposed to diffuse source pressure, but this is largely caused by the Swedish reporting of diffuse mercury pollution, as noted earlier. No pressures are reported for more than half of the rivers draining to the Black Sea, but only in < 10% of the rivers draining to the Baltic Sea.

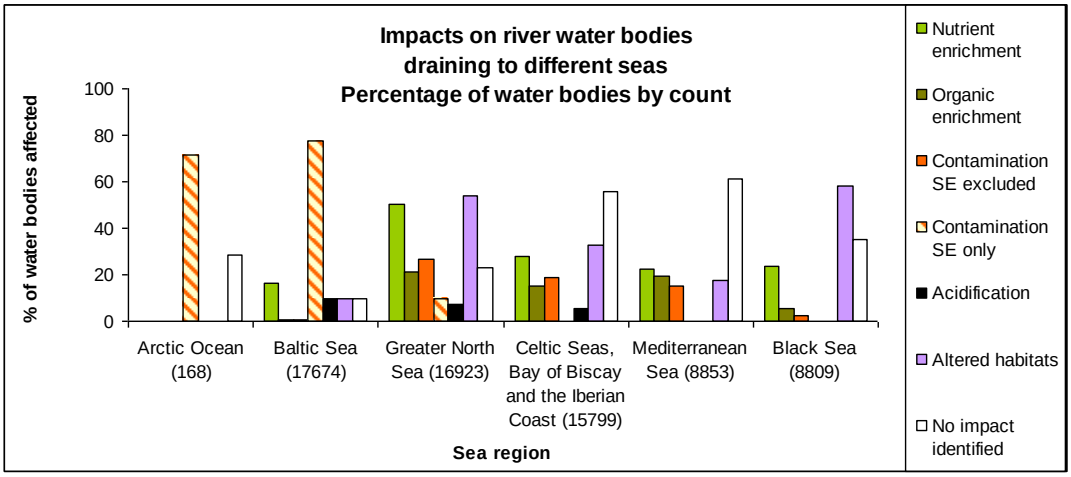


Figure 2.2.2. Distribution of impacts on classified European river water bodies draining to different seas.

If excluding contamination by mercury in Swedish rivers draining to the Baltic and Arctic Seas, the most severe impacts are found in the rivers draining to the Greater North Sea (figure 2.2.2). The most dominant impacts are nutrient enrichment, coming from diffuse and point source emissions from agriculture, urban and industrial waste waters, as well as altered habitats caused by hydromorphological alterations. Also organic enrichment and contamination are quite significant impacts in rivers draining to this sea region. The rivers draining to the Baltic Sea are reported to have less impacts than rivers draining to other sea regions. Nutrient enrichment is highest impact, but only reported for less than 20% of all river water bodies. The other impacts in rivers draining to the Baltic Sea are altered habitats and acidification. If excluding the Swedish mercury contamination, the proportion of rivers affected by impacts in the rivers draining to the Baltic Sea is smaller than the proportion of rivers in less than good status. This inconsistency may be due to lack of impacts reporting from Poland and Lithuania. For the Mediterranean and Celtic Sea regions, there are no impacts reported for ca. half of the rivers, whereas other sea regions have fewer rivers without impacts. In these sea regions, less than on third of the rivers are reported to be affected by any impact. The Black sea rivers are mainly impacted by altered habitats reported for more than half of the water bodies, which is even higher than the hydromorphological pressures reported (figure 2.2.1) for rivers in this sea region.

Transitional waters

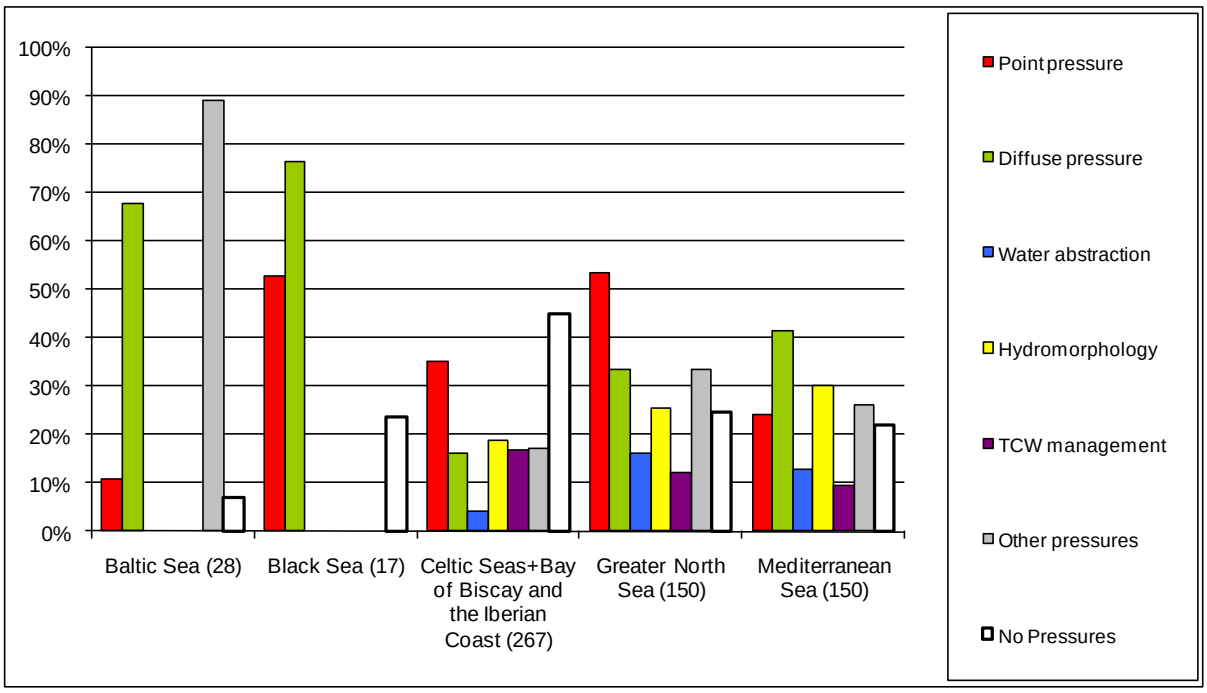


Figure 2.2.3 Distribution of significant pressures in classified transitional waters in regional. Total number of water bodies in each region given in brackets.

Note: Order of sea regions will be revised in the next version to be equal to those given in the river figures above. Notes will be added.

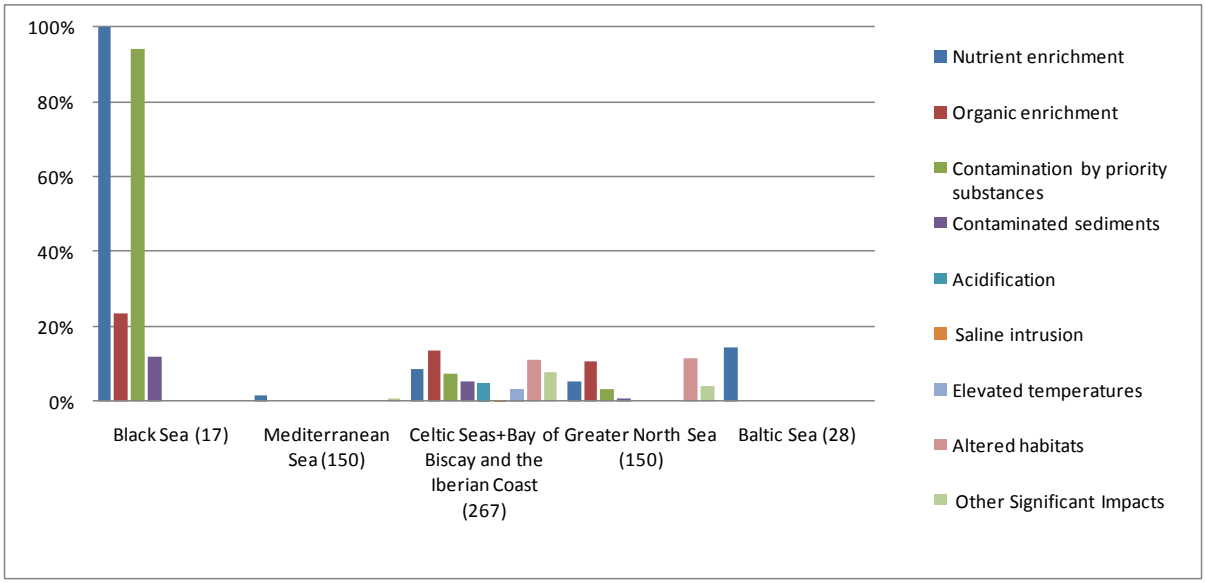


Figure 2.2.4 Distribution of significant impacts in classified transitional waters in regional seas. Total number of water bodies in each region given in brackets. Sweden has not reported HYMO impacts
Note The "No impact" category will be added in next version.
The number of impact categories will be reduced to mimic the river figure above. The order of sea regions will be harmonised with the rivers figure above. Notes will be added in next version.

The largest impacts are reported in the transitional waters of EU part of the Black Sea, where all water bodies are impacted by nutrient enrichment (figure 2.2.4). These results can explain why 90% of water bodies in the Black Sea are in less than good status. Ca 20% of water bodies are impacted by organic enrichment. Contamination by priority substances is reported in more than 90% of water bodies, although that is less relevant for ecological status. Diffuse sources are reported as the most frequent significant pressure in the Black Sea affecting ca. 75% of the water bodies. Point sources pollution is also a quite frequent pressure reported for transitional waters in this sea region, affecting ca. 50% of the water bodies (figure 2.2.3). No hydromorphological pressures, nor altered habitats are reported for transitional waters in this sea region. This is probably due to lack of reporting pressures and impacts by Romania. Physical alterations to hydromorphology, water abstraction and TCW management are reported for 10-30% of water bodies in Celtic seas, Greater North Sea and Mediterranean.

Impacts, reported in other sea regions do not explain the large proportions of water bodies in less than good status. This inconsistency is most apparent for transitional waters in the Baltic Sea, where all waters are in less than good status, while only 15% of water bodies are reported to have nutrient enrichment. This is partly caused by the missing reporting of impacts by Poland and Lithuania. Diffuse pollution has been reported as a significant pressure for close to 70% of transitional water bodies, while point sources are reported as significant for only ca. 10% of water bodies (figure 2.2.3). Other pressures are reported for almost 90% of the transitional waters. < *These should be specified in the next version of the report by checking some of the RBMPs*>

The largest proportion of transitional waters without pressures is reported for the Celtic sea, the Bay of Biscay and the Iberian Coast, where 45% of the transitional waters are reported to have no pressures. This corresponds well with the ca. 40% of water bodies in good or better ecological status in this sea region (figure 2.1.3).

For the Mediterranean region, diffuse and point source pressures are reported for ca. 40% and 25% of the transitional waters, while hydromorphological pressures are reported for 30% (figure 2.2.3), in contrast to the lack of impacts reported (figure 2.2.4). The inconsistency between reporting of pressures, impacts and status in transitional waters is probably related to insufficient reporting of impacts for transitional waters in this sea region.

Coastal waters

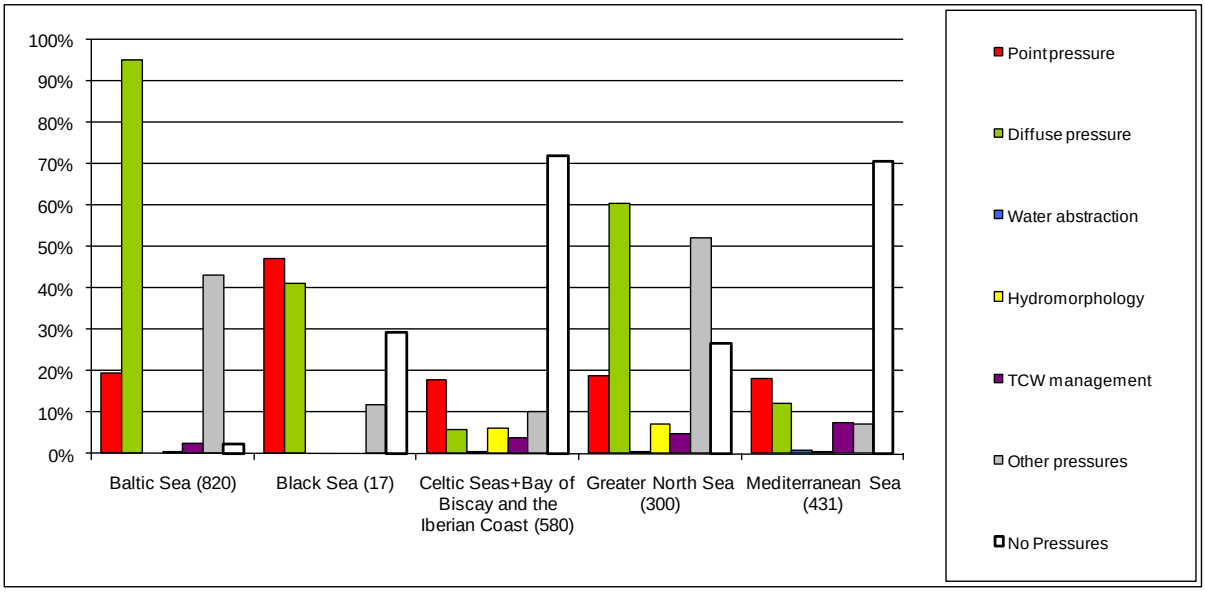


Figure 2.2.5 Significant pressures in coastal waters in regional seas given as percentage of total number of classified water bodies. Total number of water bodies in each region given in brackets.

Note: Swedish diffuse pollution by mercury are included into the Baltic and Greater North Sea regions. This should be mentioned in the Notes to the figure in the next version. Further notes on MS (#WBs) per sea region will be added in the next version. The sorting of sea regions will be harmonised with that given for rivers above. The category "Water abstraction" does not make sense for coastal waters, and should be merged with "Other pressures" in the next version. The number of coastal water bodies for the Black Sea should be checked, as this is the same as the number of transitional water bodies for this sea region.

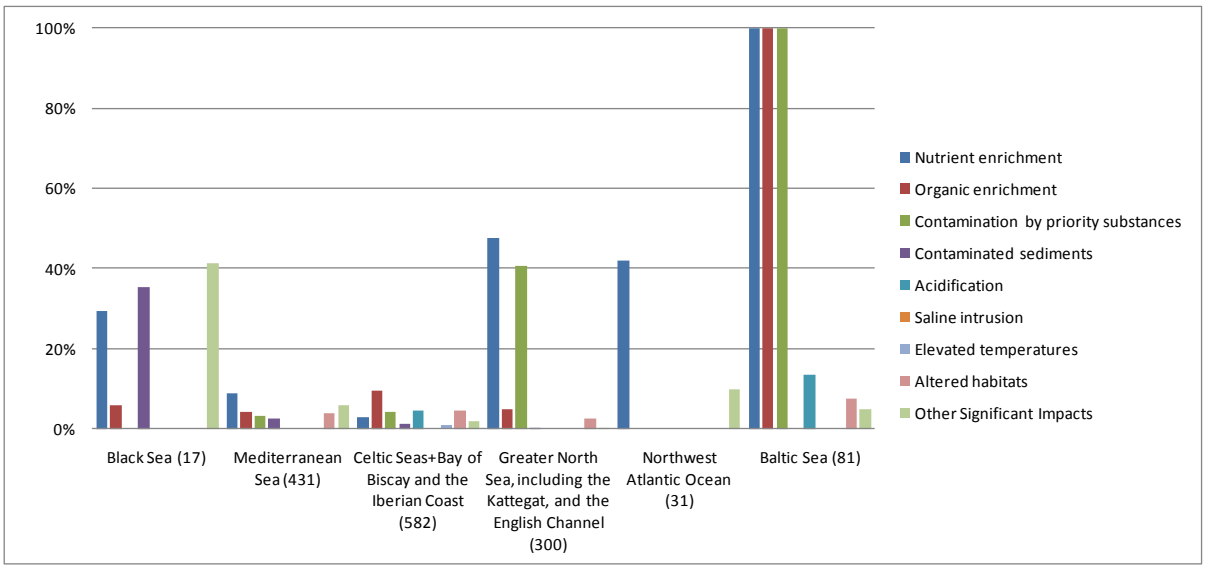


Figure 2.2.6 Significant impacts in coastal waters in regional seas given as percentage of total number of classified water bodies. Total number of water bodies in each region given in brackets.

Note: Same comment as for the equivalent figure for transitional waters. The number of coastal water bodies for the Baltic cannot be correct, as this is 820 in the pressure figure and only 81 here. These updates should be done

for the next version. Notes on MS and #WBs should be added. Saline intrusion does not make sense for coastal waters and should be merged with "Other significant impacts

The largest impacts are reported in the coastal waters of the Baltic Sea, where all water bodies are impacted by nutrient and organic enrichment and contamination (figure 2.2.5). These results can explain why 82% of the coastal waters in the Baltic Sea are in less than good status. Diffuse and point sources are reported as the most significant pressures, together with other pressures, which are not specified (figure 2.2.6).

Nutrient enrichment, reported in the Greater North Sea corresponds to reporting of diffuse sources pollution in 50% of the coastal water bodies. Point and diffuse sources are reported in more than 40% of water bodies in the Black sea, while nutrient enrichment is reported for 30% of water bodies and only 5% of water bodies are reported as impacted by organic enrichment.

Physical alterations to hydromorphology, water abstraction and TCW management are reported for less than 10% of the coastal water bodies in all regions, except for the Black Sea. Largest proportion (70%) of waters without pressures in the Celtic Seas + Bay of Biscay and Iberian sea and in Mediterranean. (fig. 2.2.5)

9.3. Assessment of status, pressures and impacts of rivers, transitional and coastal waters in different sea regions

A helping table that summarizes the information for the sea regions will be elaborated for the next version.

Sea Region	Rivers	Transitional	Coastal
Baltic Sea region	Ecological Status/Potential % not having Good status		
	Main Pressures No Pressures %WBs Diffuse Pollution %WBs HYMO %WBs		
	Main Impacts No impacts %WBs Diffuse Pollution %WBs HYMO %WBs		
Same for other sea regions			

This text will be checked and amended once the helping table has been elaborated.
The worst sea region in terms of transitional and coastal water status is the Baltic Sea, where all the transitional and 82% of coastal water bodies are in less than good status/potential. This does not correspond to the ecological status of the rivers draining to the Baltic Sea, as these have only ca. 50% of water bodies in less than good ecological status, and less than 20% of river water bodies have been reported to be impacted by nutrient enrichment and other impacts. The low impact reported for rivers draining to this sea region is related to the high

number of river water bodies coming from Northern parts of Sweden (and Finland), where there are low pressures. The worst ecological status in coastal waters in the Baltic sea is found the Southern part, as well as in the Gulf of Finland, and in this area also the riverine inputs are still high (see section 2.4 below). Overall status of the Baltic Sea illustrates that it has accumulated all the land-based and atmospheric pollution, and has not yet recovered from excessive long-term pollution loads during previous decades (needs to be reconsidered and a conclusion drawn later from additional info from HELCOM). Contamination with priority substances is also very high in the coastal water of the Baltic Sea, but this will be reflected in poor chemical status of these waters, and may of course also have ecological impacts. The high contamination reported for the rivers draining to the Baltic Sea mainly comes from the Swedish rivers, but this can be due to different assessment methods used for contamination.

The highest proportion of river water bodies in less than good ecological status is found in the rivers draining to the Greater North Sea (80%), which are also heavily impacted by nutrient and organic enrichment coming from diffuse and point sources and altered habitats caused by hydromorphological changes in the river systems. The hydromorphological changes do not only affect the habitats for riverine flora and fauna, but also has a negative impact on the self-purification capacity of the rivers. The high pressures and the reduced self-purification capacity in the rivers draining to the North Sea, including the Rhine (see next paragraph) are probably responsible for the high proportion of transitional and coastal waters in less than good status in this sea region (60-70%). (*Add info later from OSPAR and Rhine Commission concerning current and trends in nutrient loads*)

For the Celtic Sea, Bay of Biscay and Iberian Coast the proportion of rivers in less than good ecological status is ca. 50%, caused by a mixture of impacts including nutrient and organic enrichment, altered habitats and contamination (although the latter may primarily affect chemical status). This corresponds to ca. 60% of transitional water bodies in less than good status, while the impacts on the coastal waters are considerably lower (only ca. 15% in less than ecological status), which explained by strong currents, deep waters and high level of water exchange in this area.

In the Mediterranean sea region, the proportion of rivers in less than good ecological status is ca. 50%, caused by a mixture of impacts including nutrient and organic enrichment, to a lesser extent also by altered habitats and contamination (although the latter may primarily affect chemical status). This contributes to the high proportion of transitional water bodies in less than good status (70%). Largest percentage of waters in less than good status is reported along the French and Northern Spanish coastline as well as along mainland Greek coastline. Significant pressures from point and diffuse sources are reported by these countries as well as by Italy. The impacts on the coastal waters are considerably lower (only ca. 20% in less than ecological status), which can be explained by low riverine loads in comparison to the large volume of the sea water. The river status is worse than the coastal waters due to the high evaporation and dry climate in the sea region, causing higher concentrations of pollutants in the rivers.

In the Black Sea, the proportion of rivers in less than good ecological status is ca. 50%, caused primarily by altered habitats, caused by the hydromorphological changes, and to some lesser extent by nutrient enrichment. There seems to be little impact by organic enrichment in the rivers in this region, which are dominated by the Danube and its tributaries. This may be explained by improved urban waste water treatment in the Danube catchment during the last decades (ref. ICPDR report). Further information on the Danube is presented in section 2.4.

The transitional and coastal waters have 90% and 70% respectively of their water bodies in less than good ecological status, which cannot be explained only by the riverine inputs reported. This poor status of transitional and coastal water bodies in the EU part of the Black Sea may be caused, at least partly, by the massive inputs of waste water from the touristic areas along the coast of Romania and Bulgaria, which is due to lack of reporting pressures and impacts by Romania, in particular. Less than 10% of transitional waters and ca. 50% of coastal water bodies are reported to have significant pressures from point sources. The main problem in transitional waters is reported to be nutrient enrichment coming from diffuse sources. *Add some info from the Black Sea commission.*

9.4. Status, pressures and impacts in the Rhine and the Danube

The analysis of the Rhine river transect from its headwaters to the coast (figure 2.4.1) shows that the ecological conditions decline following the main stem of the river downstream from the Alps to the river mouth in the Netherlands. In the three uppermost sub-units altered habitats is the main, or the only, impact (figure 4b). This is probably related to hydropower activities. The impact by altered habitats increases downstream, where it to a larger extent may be related to flood protection and agriculture. The proportion of water bodies affected by nutrient and organic enrichment also increases markedly downstream, following the main stem. Together these impacts can explain the decline in ecological conditions.

The ecological conditions are generally better in the French Moselle than in the German Neckar and Main tributaries. In the latter two sub-units, both altered habitats and nutrient enrichment affect a high proportion of the water bodies, whereas in the Moselle, the main impact is contamination, which does not necessarily affect ecological status. The poorer conditions in the Neckar and Main mean that there is a slight improvement going downstream from here, while the opposite is true for the Moselle.

a) **b)**

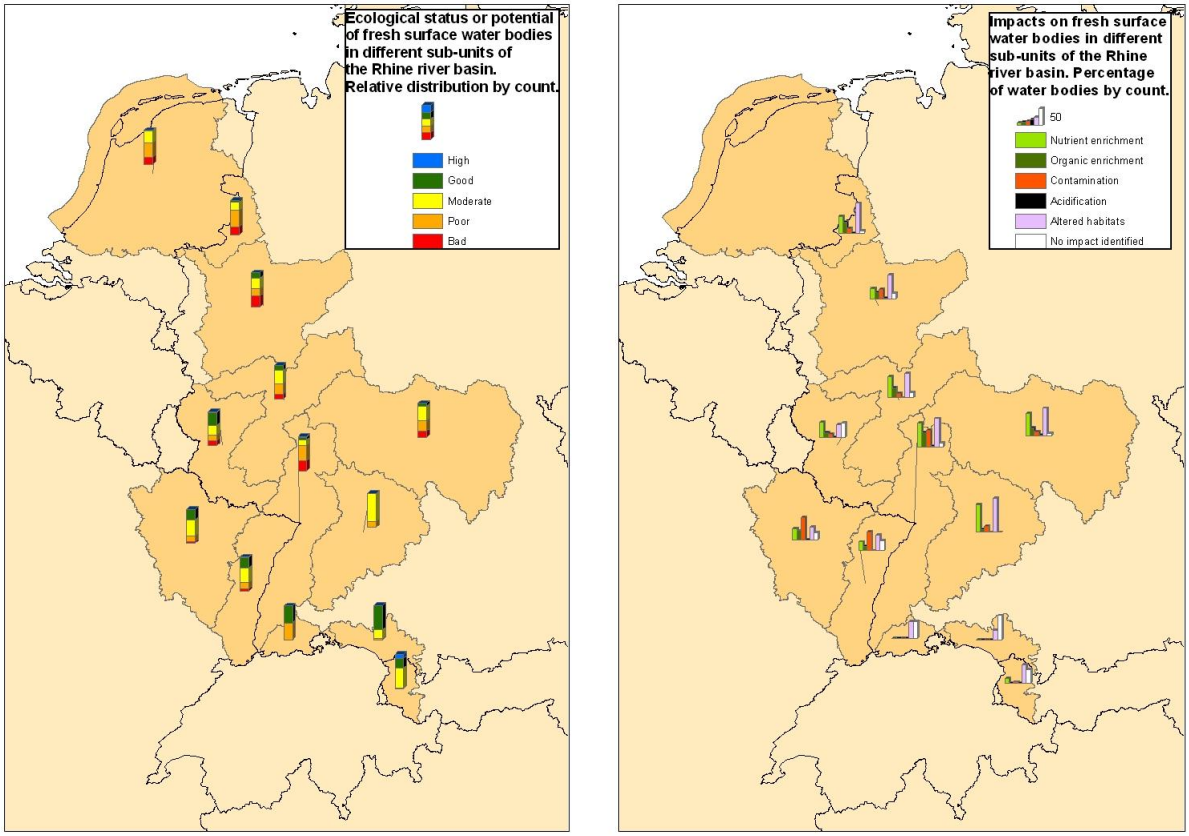


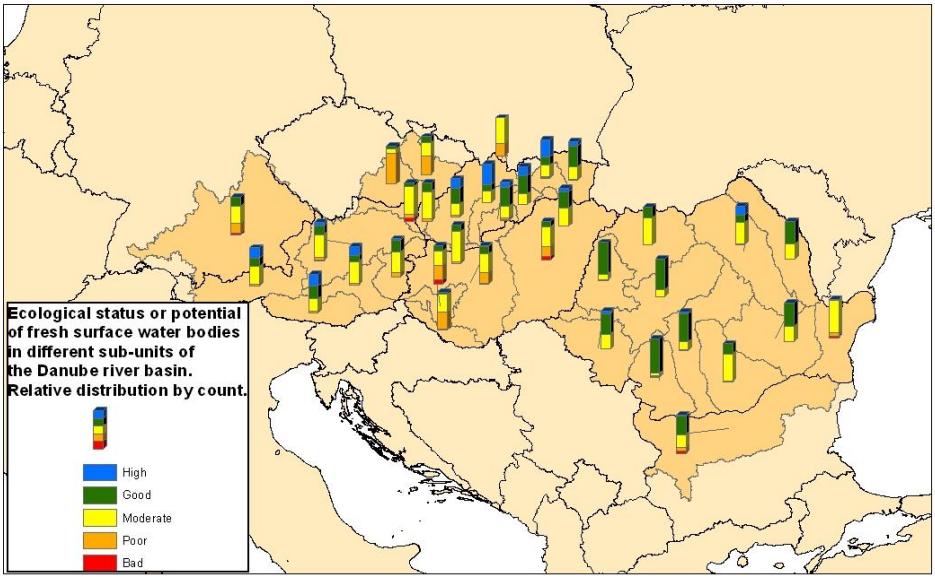
Figure 2.4.1 a) Relative distribution of ecological status or potential of classified fresh surface water bodies in sub-units of the Rhine RBDs given as percentage of total number of water bodies in different ecological status classes. b) The percentage of total number of classified fresh surface water bodies affected by various impacts in sub-units of the Rhine RBDs

NOTE: The Netherlands did not report impacts.

The map of ecological status or potential of Danube sub-units (figure 2.4.2.a) does not to such a large extent as the Rhine map reflect an upstream-downstream decline in ecological conditions. Rather, it shows the difference between higher altitude, less densely populated areas (western Austria, northern Slovakia, mid-Romania) and lower altitude, more densely populated areas with more intensive agriculture (south Germany, eastern Austria eastern Czech Republic, Hungary, eastern Romania). The main stem of the Danube is largely flowing through the sub-units with the worst ecological conditions, while the conditions are better in the tributary sub-units.

The differences between the higher and lower lying areas are less evident from the impacts map of the Danube sub-units (figure 2.4.2.b), due to the lack of reporting from Slovakia and Romania. However, it does show nutrient enrichment in the lower lying areas of south Germany, eastern Austria and Czech Republic, and mid-Hungary. It also shows the strong impact of altered habitats many places. Overall, this is the most important impact in the Danube sub-units with impacts data.

a)



b)

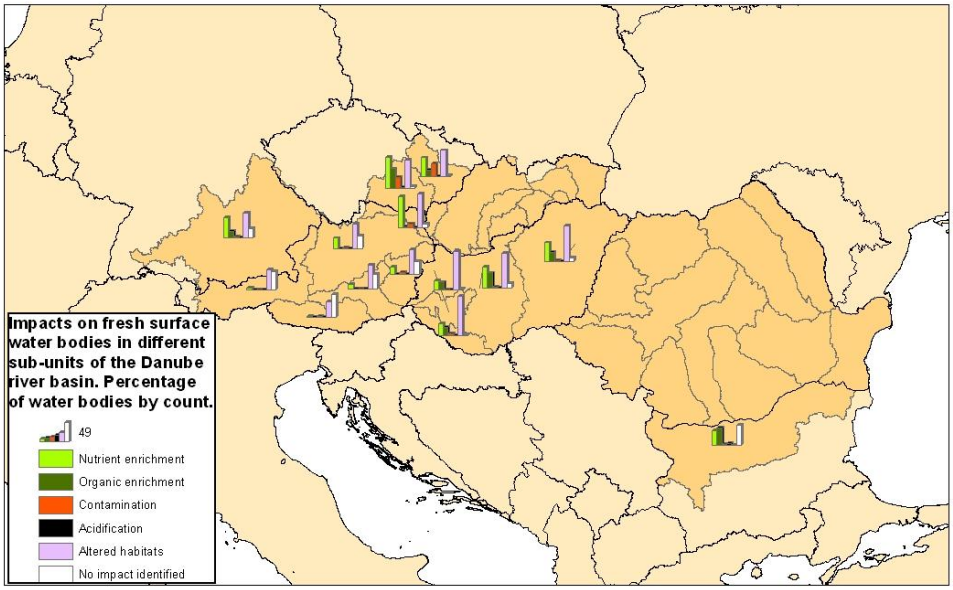


Figure 2.4.2: a) Relative distribution of ecological status or potential of classified fresh surface water bodies in sub-units of the Danube RBDs given as percentage of total number of water bodies in different ecological status classes. b) The percentage of total number of classified fresh surface water bodies affected by various impacts in sub-units of the Danube RBDs.

NOTE: Slovakia and Romania did not report impacts.

Similar maps will be made for the next version for:

- Baltic Sea region – For each RBDs showing river ecological status/potential; main pressures and impacts; ecological status of transitional and coastal WBs and main pressures/impacts
- EU RBDs to the Mediterranean
- RBDs to the greater North Sea

10. Ecological status by different types

Placeholder until enough information – moved to Anne & Monikas section

10.1. Case study

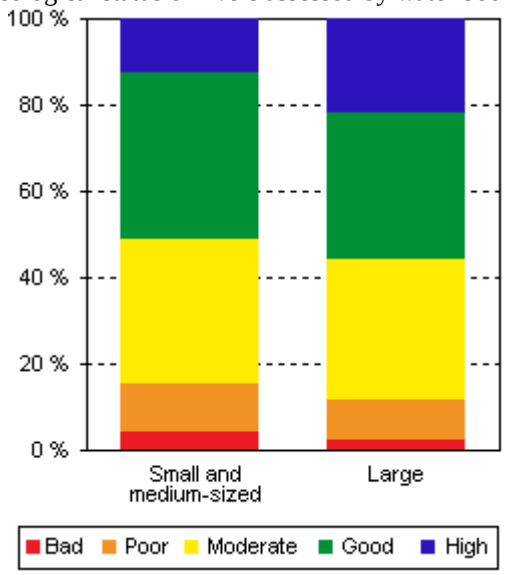
10.1.1. Finland

Rivers
Source:
http://www.ymparisto.fi/default.asp?node=24597&lan=en
Most rivers in Northern Finland are in a good or high state. Exceptions include certain tributaries of larger rivers, where conditions are only classified as moderate.
Rivers in a bad or poor state are particularly found in coastal areas of Southern and SW Finland, where river systems have been altered in many ways. Factors harmful to aquatic life include:

- Eutrophication due to nutrient inputs from diffuse sources, notably farmland
- Increased acidity and metal concentrations due to the artificial drainage of areas with acidic sulphate-rich soils.

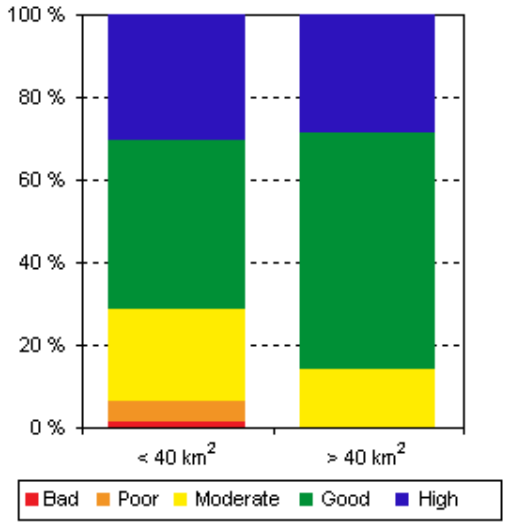
Fish deaths are common events in many rivers along Finland's west coast, which are classified as being in a bad condition. In many unfavourably rated rivers the prospects for fish and benthic animals are also often harmed by artificially altered channels and regulated water levels.

Ecological status of rivers assessed by water bodies



Lakes
Source:
http://www.ymparisto.fi/default.asp?node=24598&lan=en
Finland has as many as 187,888 lakes, but sufficient monitoring data is only available to classify the ecological state of a fraction of them. About 72% of the classified lakes are in a high or good state, for large lakes this figure is even higher, at 86%.
Larger lakes classified as being in a moderate state include lakes that have long been affected by runoff from surrounding farmlands and wastewater from settlements and industry.
Almost a third of the evaluated small and medium-sized lakes are classified as being in a poorer state than good. These lakes are typically characterised by observable negative impacts of eutrophication induced by nutrient loads, such as algal blooms. They are mainly in areas dominated by agriculture.

Large lakes faring well, but some smaller lakes have troubled waters
Ecological status of lakes assessed by water bodies



Coastal waters

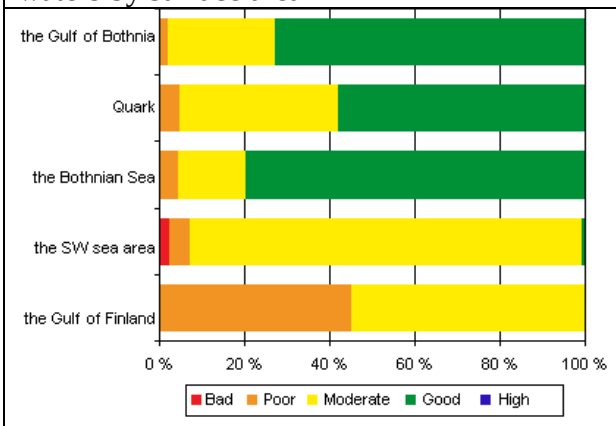
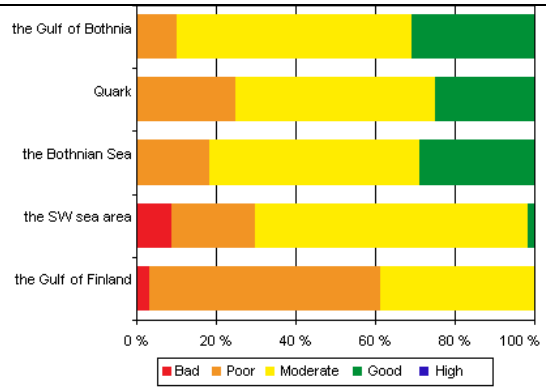
Conditions moderate in the Gulf of Finland and Archipelago Sea, good in the Gulf of Bothnia

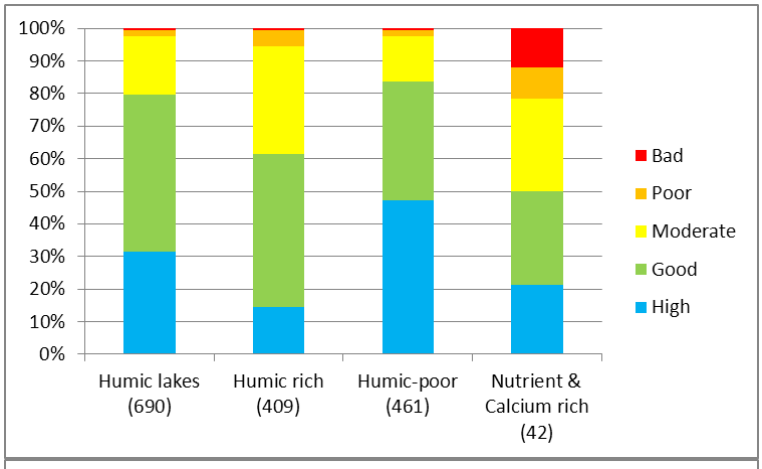
Source: http://www.ymparisto.fi/default.asp?node=24599&lan=en

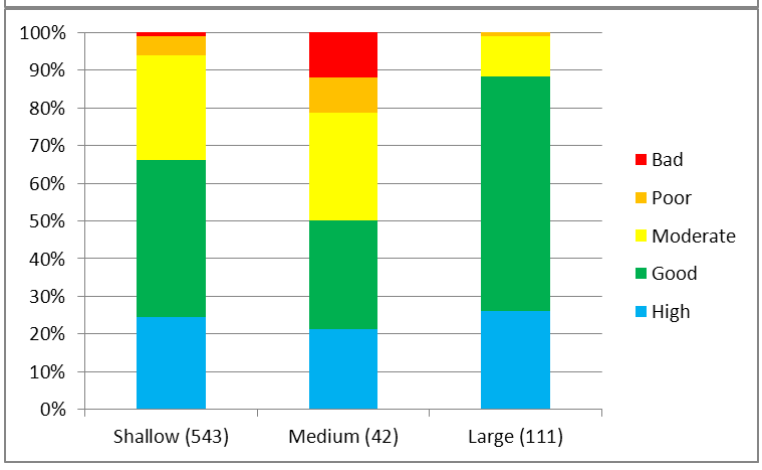
Almost half of Finland's coastal waters are in a good ecological state, and just over half are in a moderate or poorer state. Most of the waters in a good state are in the outer coastal waters of the Gulf of Bothnia, whereas conditions nearer the Bothnian coast are mainly moderate.

In the Gulf of Finland and the Archipelago Sea, inshore waters are generally in a poor state, while in outer archipelagoes and further offshore conditions are mainly moderate. In the eastern waters of the Gulf of Finland the situation is the reverse, with conditions poorer in the outer archipelago than nearer the mainland.

Discussion of the marked difference in percentage by area or by number of WBs

Ecological states of different Finnish marine waters by surface area	By numbers of water bodies
	





Finnish lakes – FI_SWB_lakes.xls

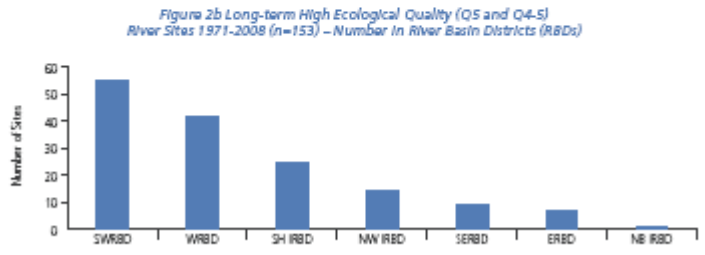
10.2. Trend in high ecological Irish river sites

Source: EPA Water Quality in Ireland 2007-2008. Key Indicators of the Aquatic Environment.
http://www.epa.ie/downloads/pubs/water/waterqua/Water%20Quality%20in%20Ireland%202007%20-%202008%20%20Key%20Indicators%20of%20the%20Aquatic%20Environment.pdf
High ecological quality at river sites is an indicator of largely undisturbed conditions and reflects the natural background status or only minor distortion by anthropogenic influences. The ecological quality of Irish rivers has been assessed, using a biotic index scheme since 1971. This biotic index has been converted to ecological status and the trend in proportion of Irish rivers in high ecological status is illustrated.

The percentage number of high quality sites (Figure 2a) has almost halved in the 21 years between 1987 and 2008 and what is more striking is the seven-fold decrease of those attaining Reference Condition (Q5); the latter fraction, less than two per cent in the current period, being the same as for the 2004-2006 period. In each survey period the decline in high status sites has continued, from almost 30 per cent of the total sampled in the 1987-1990 period to less than 17 per cent in 2006-2008 (Figure 2a).

A decline in the percentage number of high status sites was noted in all river basin districts between 1987 and 2008. The largest percentage number of high status sites continues to be located in the less densely populated and less developed, as well as less intensively farmed regions (South Western and Western RBDs).

One of the aims of the Water Framework Directive (WFD) is to maintain high status of water where it exists but where practicable the River Basin Districts (RBDs) should, in addition, strive to restore former high quality sites as well.



Source: EPA (C. Bradley, K. Clabby, J. Lucey and M. McGarrigle)

11. Countries overview

11.1. Basis for classification (may go into an Annex to this chapter)

a) Freshwater (rivers and lakes) b) Transitional and coastal waters

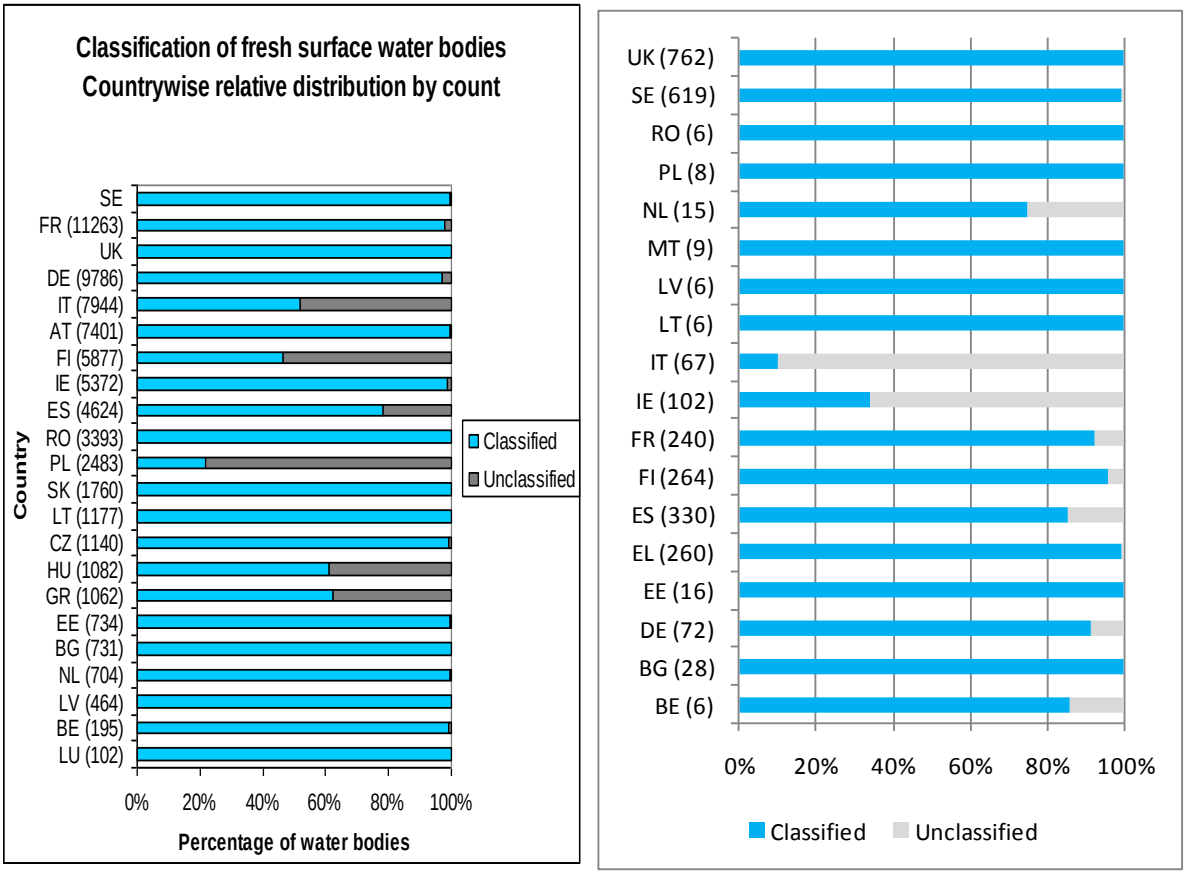


Figure 11.1.1: Relative distribution of classified versus unclassified surface water bodies by count in different countries, a) freshwater (rivers and lakes combined, total number of water bodies is 100288), b) transitional and coastal waters (total number of water bodies is 3726, 23% (910) are not classified while 75% (2816 are classified). The countries are sorted by the number of surface water bodies reported (not yet done for TC). The number of water bodies in each country is indicated after the country code.

Notes: Country abbreviations: SE = Sweden, FR = France, UK = the UK, DE = Germany, IT = Italy, AT = Austria, FI = Finland, IE = Ireland, ES = Spain, RO = Romania, PL = Poland, SK = Slovakia, LT = Lithuania, CZ = Czech Republic, HU = Hungary, GR = Greece, EE = Estonia, BG = Bulgaria, NL = The Netherlands, LV = Latvia, BE = Belgium, LU = Luxembourg.

NOTE: Belgium, Spain, France and Poland have not reported all their RBDs. The number of water bodies for SE and UK does not show up in the plot (will be sorted out in later versions of the assessment).

Countries could also be sorted by the proportion of classified water bodies. This will be tested for the next version.

Countries could also be sorted by the proportion of classified water bodies. This will be tested for the next version.

Assessment text will be provided in the next version.

a) Freshwater (rivers and lakes) b) Transitional and coastal waters

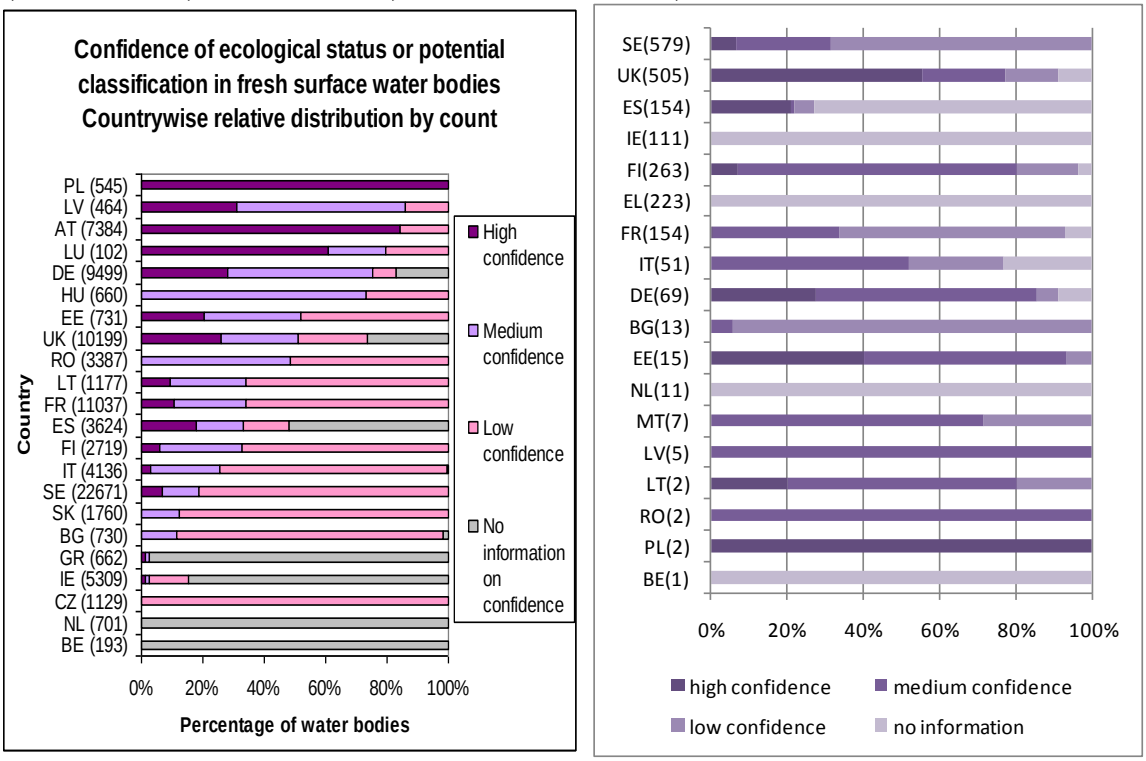


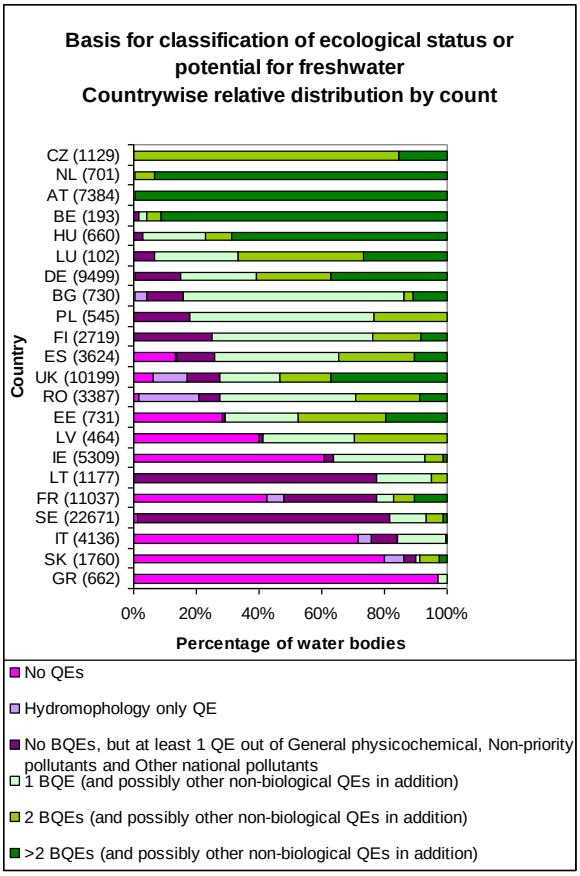
Figure 11.1.2: Relative distribution of the confidence in classification of surface water bodies in different countries. a) freshwater (% of total number of classified rivers and lakes, total number of water bodies is 88819), b) transitional and coastal water (75% of total number of classified transitional and coastal water bodies, total number of water bodies is 3726, 30% with high/medium confidence) The countries are sorted by the proportion of water bodies classified with high and medium confidence (not yet done for TC). The number of classified water bodies in each country is indicated after the country code.

Notes: Country abbreviations: PL = Poland, LV = Latvia, AT = Austria, LU = Luxembourg, DE = Germany, HU = Hungary, EE = Estonia, UK = the UK, RO = Romania, LT = Lithuania, FR = France, ES = Spain, FI = Finland, IT = Italy, SE = Sweden, SK = Slovakia, BG = Bulgaria, GR = Greece, IE = Ireland, NL = The Netherlands, CZ = Czech Republic, BE = Belgium. The Netherlands and Belgium did not report confidence level of their classification.

Assessment text will be provided for freshwater as well, for the next version.

Overall, 79% of coastal water bodies and 65% of transitional water bodies was classified with different level of confidence. 48% of coastal water bodies were classified with reported high or medium confidence level in results. Low confidence or no information about confidence levels was reported for 52% of coastal waters. Level of confidence in classification varies among countries. There is no information on confidence for 60% of transitional water bodies. In addition 21% were classified with low confidence, meaning that only 19% of transitional water bodies were classified with high or medium confidence. (Figure 11.1.2)

a) Freshwater (Rivers and lakes combined)



b) Transitional and coastal waters

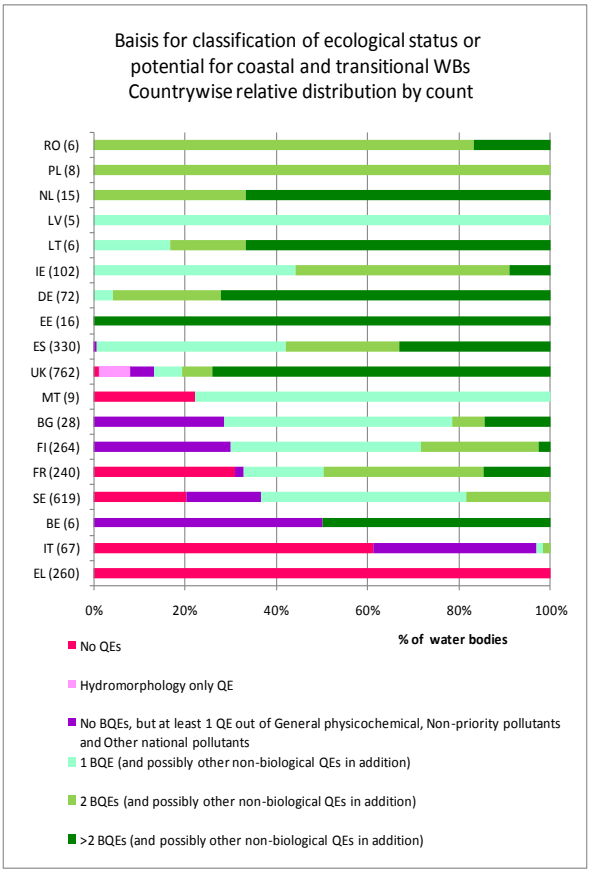


Figure 11.1.3: Relative distribution of QEs used for classification of surface water bodies in different countries a) freshwater (% of total number of classified rivers and lakes). b) transitional and coastal water (% of total number of classified transitional and coastal water bodies). (to be provided by Monika). The countries are sorted by the percentage of water bodies classified by at least one biological quality element (BQE). The number of classified water bodies in each country is indicated after the country code.

Notes: Country abbreviations: CZ = Czech Republic, NL = The Netherlands, AT = Austria, BE = Belgium, HU = Hungary, LU = Luxembourg, DE = Germany, BG = Bulgaria, PL = Poland, FI = Finland, ES = Spain, UK = the UK, RO = Romania, EE = Estonia, LV = Latvia, IE = Ireland, LT = Lithuania, FR = France, SE = Sweden, IT = Italy, SK = Slovakia, GR = Greece.

Must be redrawn in next version after correcting for the use of grouping of water bodies in AT and perhaps other countries.

Colour for "No QEs" must be changed from pink or red to grey in next version to better distinguish this from the HyMo and Phys-chem QE colours.

Assessment text will be provided for the next version.

11.2. Data quality (may go into Annex to this chapter or to a methodology chapter together with 3.1)

Data quality criteria for comparing countries:
When assessing the ecological status results at the country level, the quality of the results reported from each country is evaluated according to the following four criteria:

1. The proportion of classified water bodies should be >50% of all water bodies (figure 11.1.1)
2. Confidence should be reported and should be at least medium for >30% of all water bodies (figure 11.1.2)
3. QEs should be used for assessment for at least 50% of all water bodies (figure 11.1.3)
4. Pressures and impacts should be reported (figure 11.4.2)

Ranking of countries according to data quality for rivers and lakes
The text and table must be amended after correcting figure 11.1.3 for grouping of water bodies in AT and perhaps other countries
Sorting of countries according to the different data quality criteria for rivers and lakes:

1. Proportion of Classified WBs > 50% of all water bodies: SE, FR, UK, DE, AT, IE, ES, RO, SK, LT, CZ, HU, GR, EE, BG, NL, LV, BE (Flanders), LU (countries not fulfilling are: PL, FI, IT)
2. Confidence at least medium for >30% of all water bodies: PL, LV, AT, LU, DE, HU, EE, UK, RO, LT, FR, ES, FI (countries not fulfilling are: IT, SE, SK, BG, GR, IE, CZ, NL, BE-Flanders)
3. QEs used for >50% of all classified water bodies: CZ, NL, AT, BE(Flanders), HU, LU, DE, BG, PL, FI, ES, UK, RO, EE, LV, LT, FR, SE (countries not fulfilling are: GR, SK, IT, IE)
4. Pressures and impacts are reported: EE, ES, LV, FI, SE, IT, GR, BG, FR, AT, LT, UK, CZ, HU, PL, DE, BE (Flanders) (countries not fulfilling are: SK, RO, IE, LU, NL)

Nine countries are fulfilling all the criteria for good data quality freshwater assessment:
AT, DE, EE, ES, FR, HU, LT, LV, UK. The results reported from these countries have the best data quality of all the countries that have reported their results in the RBMPs. Even in most of these countries, the classification systems for ecological status were not completed, nor fully intercalibrated by the time of reporting. The information from Slovakia, Ireland and Italy are considered most uncertain, as they are failing 3 or more or the data quality criteria. The countries with intermediate data quality are considered to have intermediate uncertainty in their results. This ranking of countries based on data quality is taken into account when assessing the results.

Table 11.1. Data quality in different countries for rivers and lakes according to data quality criteria (see text).

Countries with best data quality fulfilling all 4 data quality criteria	Countries with intermediate data quality fulfilling at least 2 data quality criteria	Countries with worst data quality fulfilling 0-1 data quality criteria
AT, DE, EE, ES, FR, HU, LT, LV, UK	PL, FI, SE, RO, LU, GR, NL, BE (Flanders), CZ, BG	SK, IE, IT

Similar section will be made for TC waters in next version
A similar table should be made for TC for the next version.

11.3. Overall status for all four water categories at RBD level

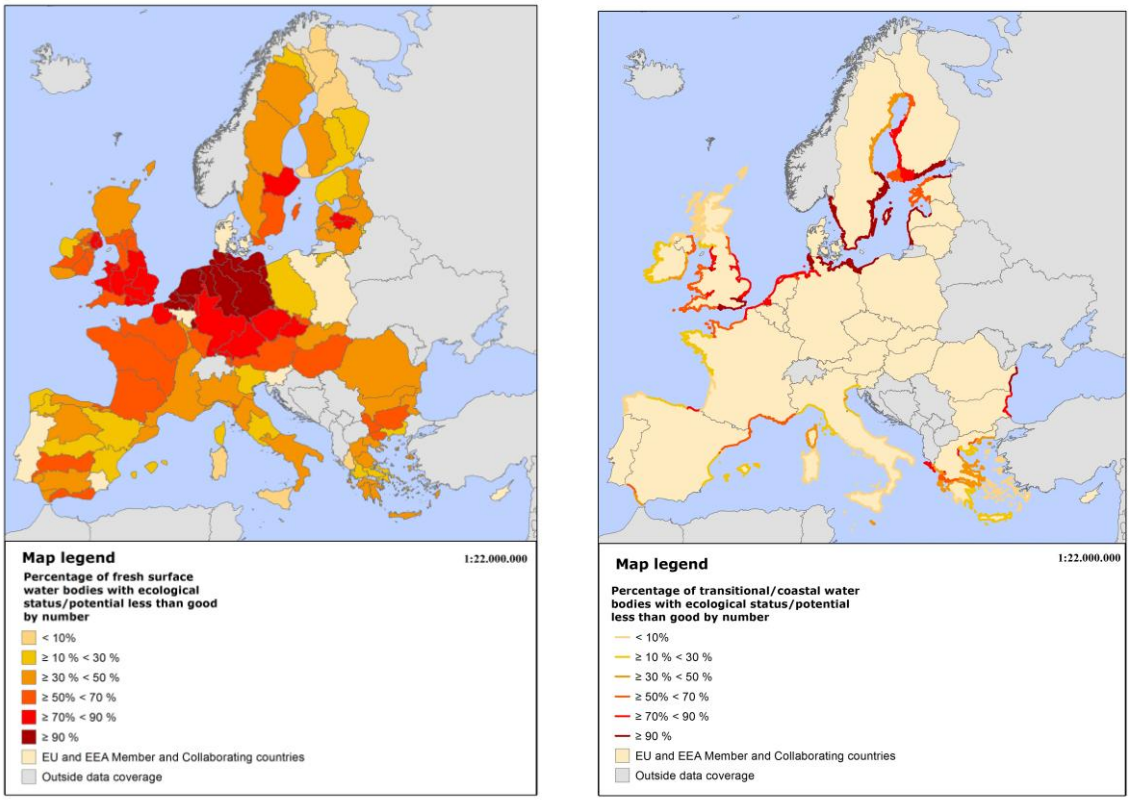


Figure 11.3.1 Proportion of water bodies in less than good ecological status or potential for rivers and lakes (left panel) and for coastal and transitional waters (right panel) in different RBDs (percentage, based on number of classified water bodies)

The RBDs with more than 90% of freshwater bodies in less than good ecological status/potential are found in Northern Germany, the Netherlands and Belgium (Flanders), while there are 70-90% in less than good status in Southern Germany, Czech Republic, Southern England, as well as several single RBDs in other countries. The map illustrates the high variability in ecological conditions within single countries, e.g. Sweden, UK, and Spain. The ecological conditions are slightly better in the southern part of Germany compared to the northern part, probably reflecting lower population density and relatively less agricultural activity. The map also shows that even in the countries with the best ecological conditions, there are regions that are less good (e.g. western Finland).

The largest areas with more than 70% of **transitional and coastal waters** in less than good status are in the Baltic region (Finland, Sweden and Lithuania) and in the Greater North Sea region in north-western Germany, the Netherland, Belgium (Flanders) and south-eastern coast of UK. Large percentages of transitional and coastal waters in less than good status are also seen in the EU part of the Black Sea (RO, BG) and along the French and Spanish coast in the north-western Mediterranean.

The lowest percentage of water bodies in less than good status is in Mediterranean in southern part of Italy, Sardinia and Sicily and in parts of Aegean Sea. The quality of data reported from Italy and Greece is however not good (see section 11.2 above), so the good status reported in the coastal and transitional waters in these countries has high uncertainty. Another area with large numbers of water bodies in high and good status is Scotland, Ireland and North-western part of Spanish coast.
< This should be amended in the next version once a similar data quality ranking has been done for TC.>

The overall share of transitional and coastal water bodies in less than good ecological status or potential ranges from 4% in Italy, to 100% in LV, PL, LT and RO. For other countries the percentage is a bit lower, but still very high - DE (90%), BE (86%), SE (82%) and FI (82%). 11 countries have more than 50% of coastal and transitional water bodies in less than good ecological status/potential. Sweden, UK and Finland have a largest number of water bodies in less than good status, but these countries have overall also very large number of water bodies. (Figure 11.1.1)

11.4. Rivers status, impacts and pressures by countries

River ecological status and potential

The best ecological status of rivers is found in Estonia, where 75% of the water bodies are in good or better status. Also in Slovakia, Romania, Finland, Spain, Latvia, Sweden, Ireland and Italy the ecological status is quite good with more than 50% of the water bodies in good or better ecological status/potential (figure 11.4.1). For Slovakia, Ireland and Italy, however, the results are quite uncertain due to poor data quality (see chapter 11.2 above).

The worst ecological status/potential in rivers is found in Belgium (Flanders) and the Netherlands, where there are no rivers in good or better status. Also in Germany, Poland (Oder RBD only), Luxembourg, Hungary and the Czech Republic more than 80% of the river water bodies are in less than good ecological status/potential. The Czech Republic has reported a very high proportion of water bodies in poor status (> 60%).

Countries at the intermediate level having 55-70% of all river water bodies in less than good status are UK, Lithuania, Austria, France, Bulgaria and Greece. .

The picture is more or less the same when considering the ecological status/potential in rivers based on proportion of total river length (figure 11.4.1, right panel).

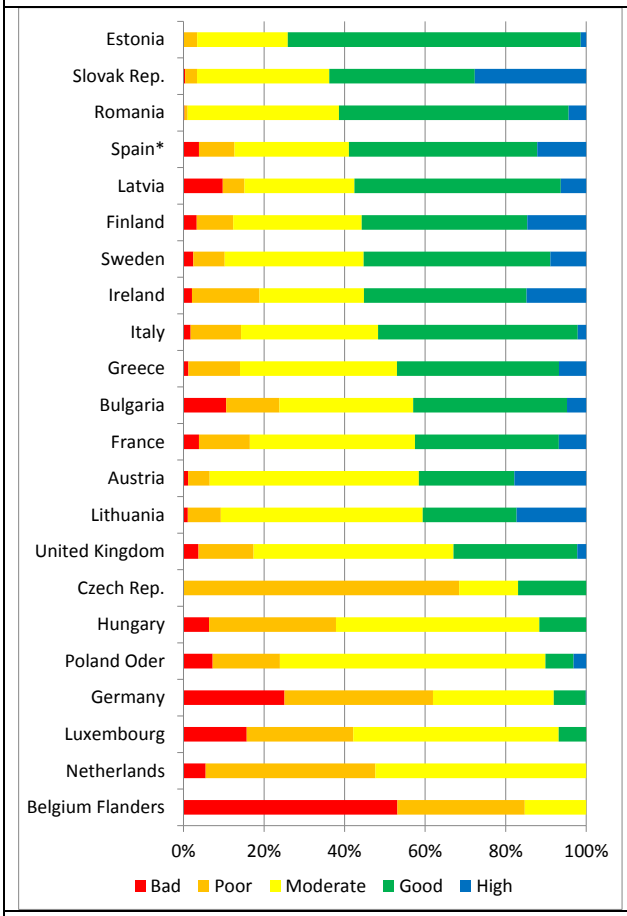
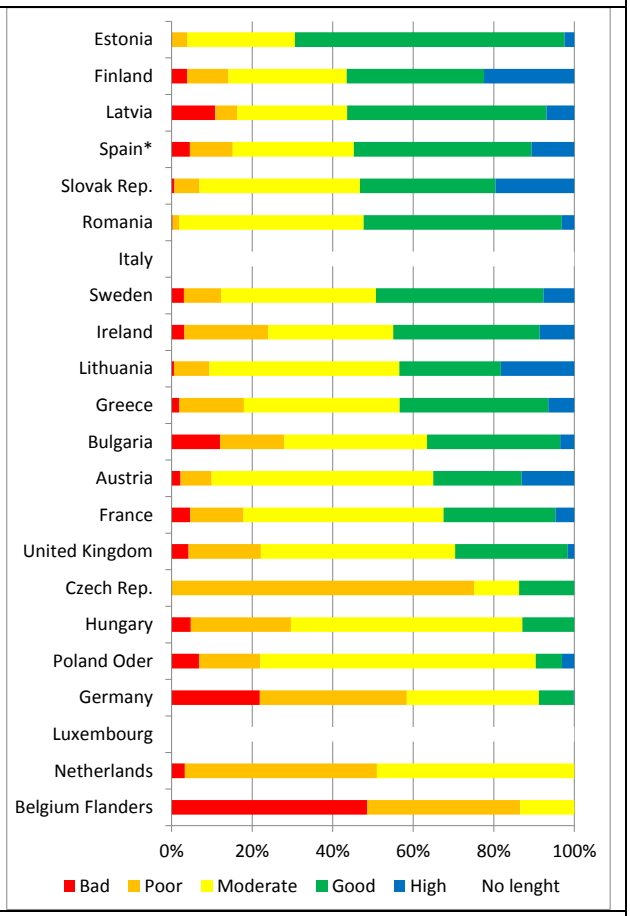
Rivers – good ecological status by count of water bodies	Rivers – good ecological status by river length
	
Excel sheet: GES_rivers_country.xlsx Notes: Based on rWBs with classified ecological status, total 74129 water bodies from 22 EU Member States: Austria; BelgiumFlanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Ireland; Italy; Latvia; Lithuania; Luxembourg; Netherlands; Poland Oder; Romania & Slovak Rep.; Spain*; Sweden & United Kingdom. Only water bodies with classified status included. Sorted by percentage of Water bodies with at least good status	Excel sheet: GES_rivers_country.xlsx Notes: Based on rWBs with classified ecological status, total 830 000 km river lenght from 21 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Ireland; Latvia; Lithuania; Luxembourg; Netherlands; Poland Oder; Romania & Slovak Rep.; Spain*; Sweden & United Kingdom. Error in river length for Italy; Only water bodies with classified status included. Sorted by percentage of water bodies with at least good status

Figure 11.4.1. Ecological status or potential of classified river water bodies in different countries sorted by proportion of good or better ecological status/potential. Left panel: % of total number of river water bodies, Right panel: % of total length of river water bodies.

River pressures and impacts

The countries with the best ecological status or potential (upper part of figure 11.4.1) e.g. Estonia, Spain, Latvia, Finland also report the highest proportion of water bodies without significant pressure or impacts (blue part of country bar in figure 11.4.2). In the countries with the worst ecological status or potential (lower part of figure 11.4.1), the vast majority of river water bodies are reported to have significant pressures and impacts (red bars in figure 11.4.2). Thus, the reporting of status, pressures and impacts seem largely consistent.

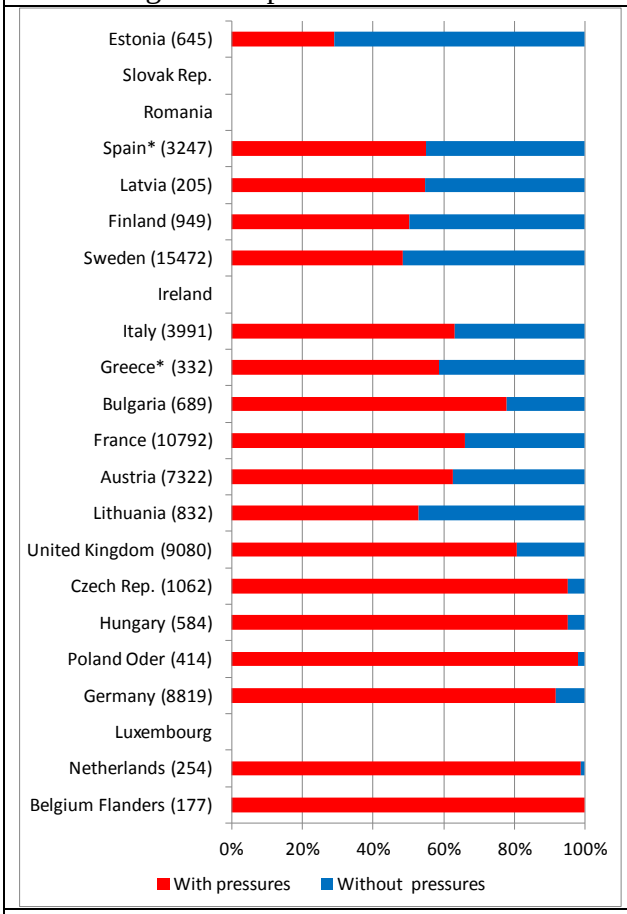
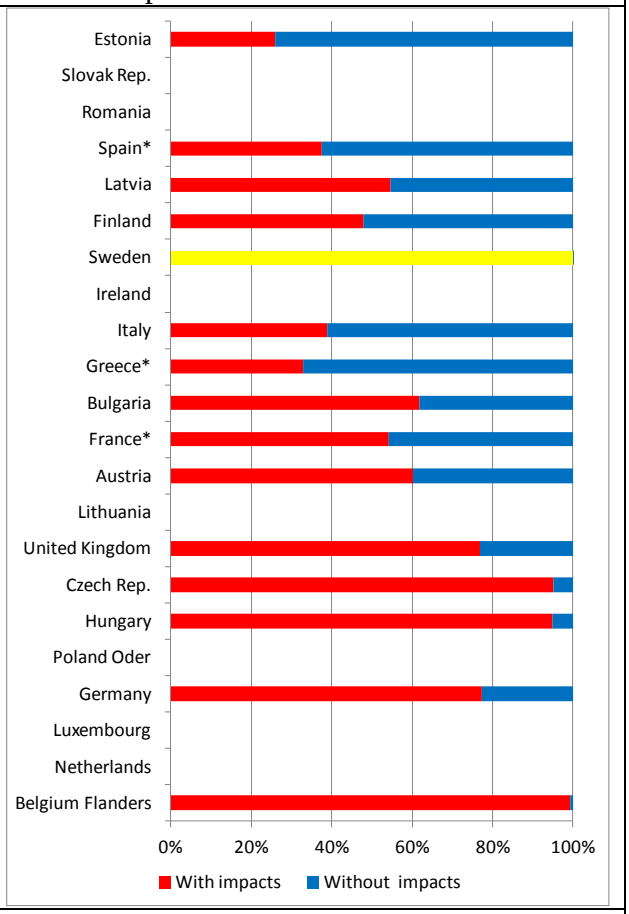
Rivers – proportion of water bodies with and without significant pressures	Rivers – proportion of water bodies with and without impacts
	
Excel sheet: pressures_rivers (2).xlsx Notes: Based on rWBs with classified ecological status, total 64866 water bodies from 18 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Latvia; Lithuania; Netherlands; Poland Oder; Spain*; Sweden & United Kingdom. No pressure data from Ireland; Luxembourg; Romania & Slovak Rep. For Sweden only include diffuse pressures related to agriculture, abandoned industrial and mining and population not connected to sewers. , Countries sorted by percentage of water bodies with at least good status	• Excel sheet: impact_rivers.xlsx Notes: Based on rWBs with classified ecological status, total 61415 (incl. Sweden)/45940 water bodies from 15/14 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom: All Swedish WBs have pressures from diffuse pollution do to with mercury

Figure 11.4.2. Left panel: Proportion of total number of river water bodies reported to be with or without significant pressures, Right panel: Proportion of total

number of river water bodies reported to be with and without significant impacts.

Individual pressures

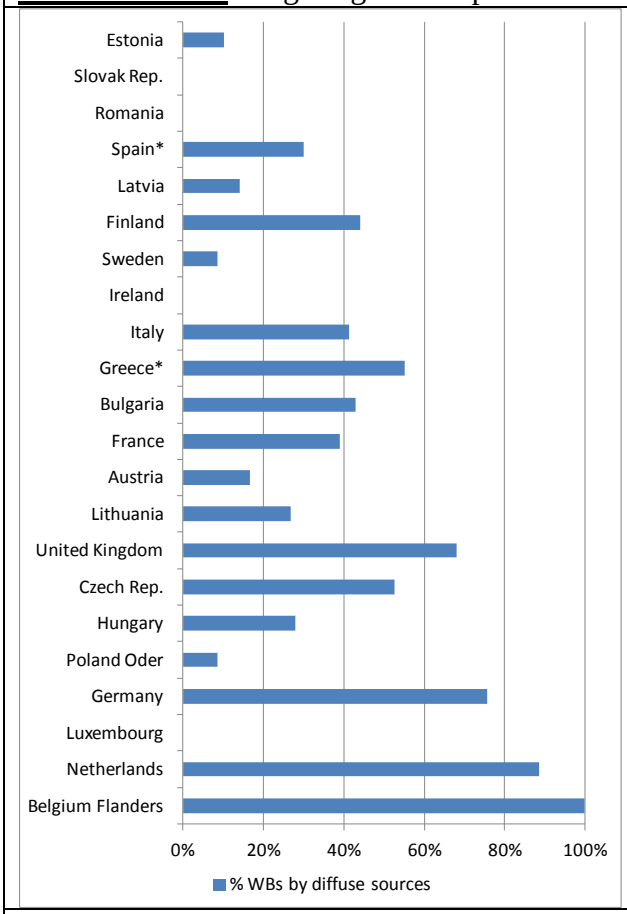
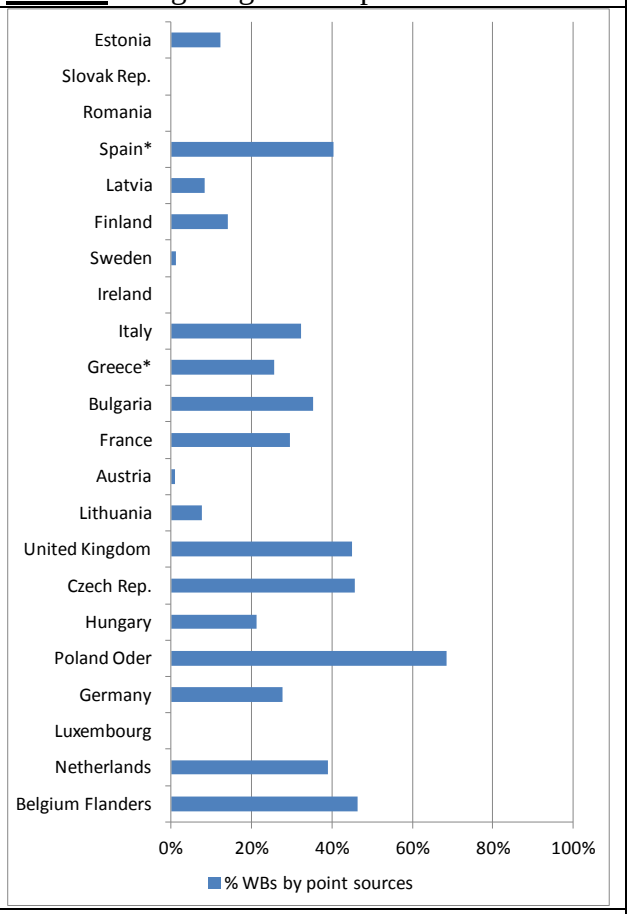
Rivers – percentage of water bodies with **diffuse sources** being a significant pressures	Rivers – percentage of water bodies with **point sources** being a significant pressures
	
Excel sheet: pressures_rivers (2).xlsx Notes: Based on rWBs with classified ecological status, total 64866 water bodies from 18 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Latvia; Lithuania; Netherlands; Poland Oder; Spain*; Sweden & United Kingdom. No pressure data from Ireland; Luxembourg; Romania & Slovak Rep. For Sweden only include diffuse pressures related to agriculture, abandoned industrial and mining and population not connected to sewers, Countries sorted by percentage of water bodies with at least good status	• Excel sheet: pressures_rivers (2).xlsx Notes: Based on rWBs with classified ecological status, total 64866 water bodies from 18 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Latvia; Lithuania; Netherlands; Poland Oder; Spain*; Sweden & United Kingdom. No pressure data from Ireland; Luxembourg; Romania & Slovak Rep. Countries sorted by percentage of water bodies with at least good status

Figure 11.4.3. Proportion of total number of classified river water bodies reported to have significant pressures from diffuse sources (left panel) and point sources (right panel). Countries are sorted according to % water bodies in good or better status (see figure 11.4.1)

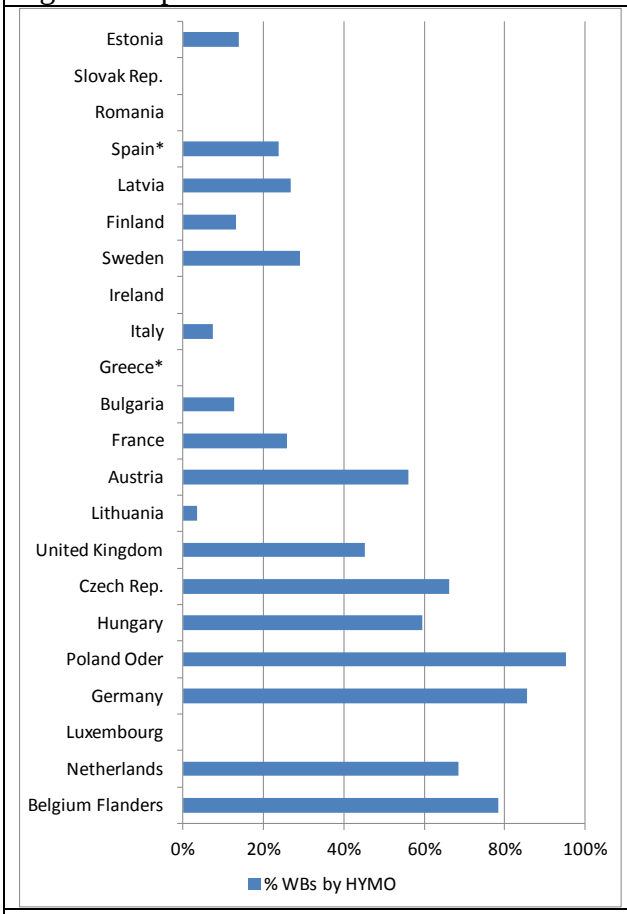
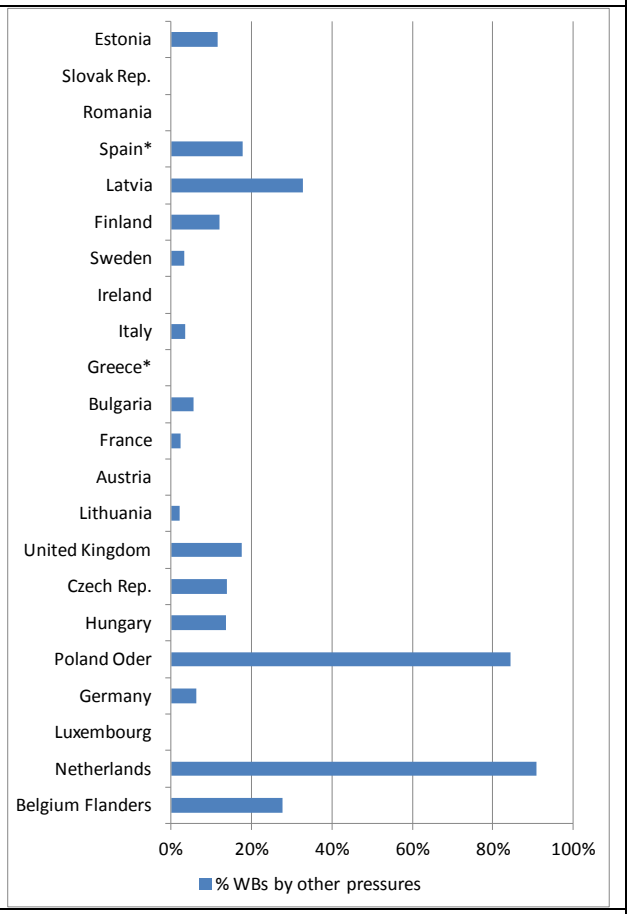
Rivers – percentage of water bodies with **hydromorphological alterations** being a significant pressures	Rivers – percentage of water bodies with **other pressures** being a significant pressures
	
Excel sheet: pressures_rivers (2).xlsx Notes: Based on rWBs with classified ecological status, total 64866 water bodies from 18 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Latvia; Lithuania; Netherlands; Poland Oder; Spain*; Sweden & United Kingdom. No HYMO pressure data from Greece, Ireland; Luxembourg; Romania & Slovak Rep. Hydromorphological pressures: Water flow regulations and morphological alterations Countries sorted by percentage of water bodies with at least good status	• Excel sheet: pressures_rivers (2).xlsx Notes: Based on rWBs with classified ecological status, total 64866 water bodies from 18 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Latvia; Lithuania; Netherlands; Poland Oder; Spain*; Sweden & United Kingdom. No pressure data from Ireland; Luxembourg; Romania & Slovak Rep. Other pressures: <to be checked with WISE electronic summary> Countries sorted by percentage of water bodies with at least good status

Figure 11.4.4. Proportion of total number of classified river water bodies reported to have significant pressures from hydromorphological alterations (left panel) and other pressures (right panel). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.4.1)

Pollution from diffuse sources is a significant pressure in many countries affecting > 50% of all classified river water bodies in Belgium (Flanders), the Netherlands, Germany and UK (figure 11.4.3), which is probably related to a high level of intensive agriculture in these countries. The countries with the lowest proportion of classified river water bodies exposed to pollution from diffuse sources are Estonia, Latvia, Sweden (Hg excl.) and Austria, where intensive agriculture and population not connected to sewage systems are at a rather low level (*text should be checked when a new figure on diffuse source pollution in different categories of % intensive agricultural land use is available*). Also Poland (Oder) reported low level of diffuse source pollution in the Oder RBD, but this is considered highly uncertain.

Point source pollution (figure 11.4.3) is still affecting >40% of classified river water bodies in Spain, UK, Czech Republic, Poland (Oder) and Belgium (Flanders), while this is close to zero in Austria and Sweden, suggesting good control of point source emissions in these countries. Also in Finland and the Baltic countries point source pollution is affecting < 15% of all classified river water bodies, suggesting that this is generally not an important pressure on rivers in these countries. Countries with low pressure from point sources are also those with low population density - A new figure will be produced to illustrate this in the next version.

Hydromorphological alterations including water flow regulations and morphological alterations are a significant pressure affecting > 40% of all classified river water bodies in Austria, UK, Czech republic, Hungary, Poland (Oder), Germany, the Netherlands and Belgium (Flanders). In Germany and Poland this pressure is significant in > 80% of all classified rivers. In all these countries hydromorphological alterations contribute to explain the large proportion of river water bodies in less than good ecological status/potential. The countries where hydromorphological alterations are less important for rivers are Estonia, Finland, Italy, Bulgaria and Lithuania. In Sweden, where the majority of classified river water bodies are in good or better status, this pressure is significant in 30% of the classified rivers, which is more important than diffuse pollution, if excluding diffuse pollution of Hg. Hydromorphological alteration is therefore an important pressure in most of the river water bodies in less than good ecological status/potential in Sweden.

Other pressures, such as land drainage, is important in Poland (Oder), while climate change, fisheries and alien species (*WISE summary to be checked*) may be particularly important in the Netherlands. In both these two countries these other pressures are reported to be significant in more than 80% of all classified river water bodies.

Individual impacts

Nutrient enrichment (figure 11.4.5) is a significant impact in the majority of classified river water bodies in UK, Czech Republic, Hungary and Germany, and in more than 95% of classified river water bodies in Belgium (Flanders) (The Netherlands did not report impacts). In these countries this impact contributes to explain the large proportion of classified river water bodies in less than good ecological status or potential, and also corresponds well with the high nutrient pressure from diffuse and point source pollution reported from these countries.

The least impact of nutrient enrichment is reported in Estonia, Spain, Sweden and Austria, where only 10-20% of classified river water bodies are affected. For all these countries, except Austria, the low impact of nutrient enrichment corresponds to the low proportion of

classified river water bodies in less than good ecological status or potential, as well as to the low levels of diffuse and point source pollution reported by these countries. In Austria, the proportion of classified river water bodies in less than good status or potential is higher than the proportion impacted by nutrient enrichment and higher than those exposed to diffuse and point source pollution. This is due to the large importance of hydromorphological pressures causing altered habitats that negatively affect the ecological status/potential in their rivers.

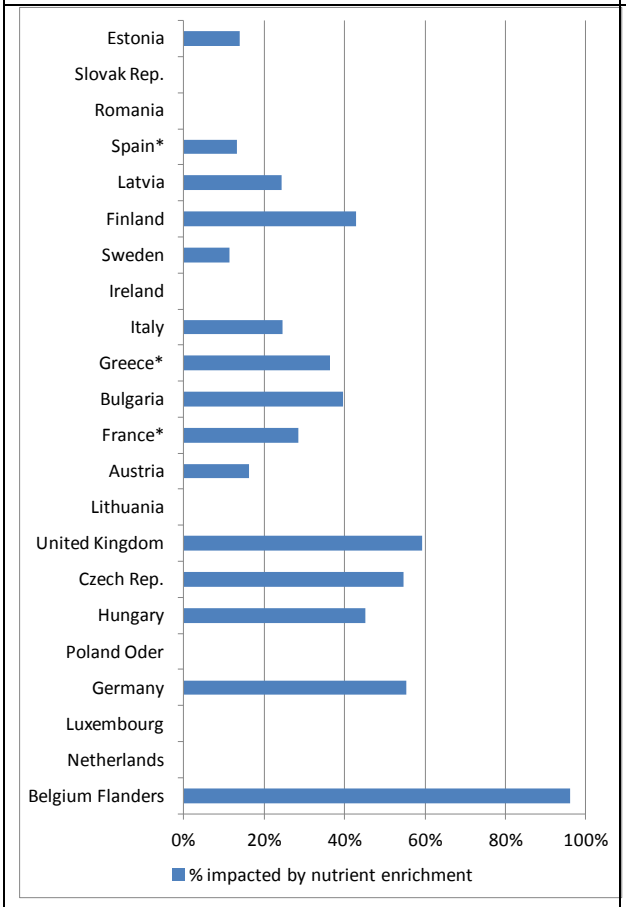
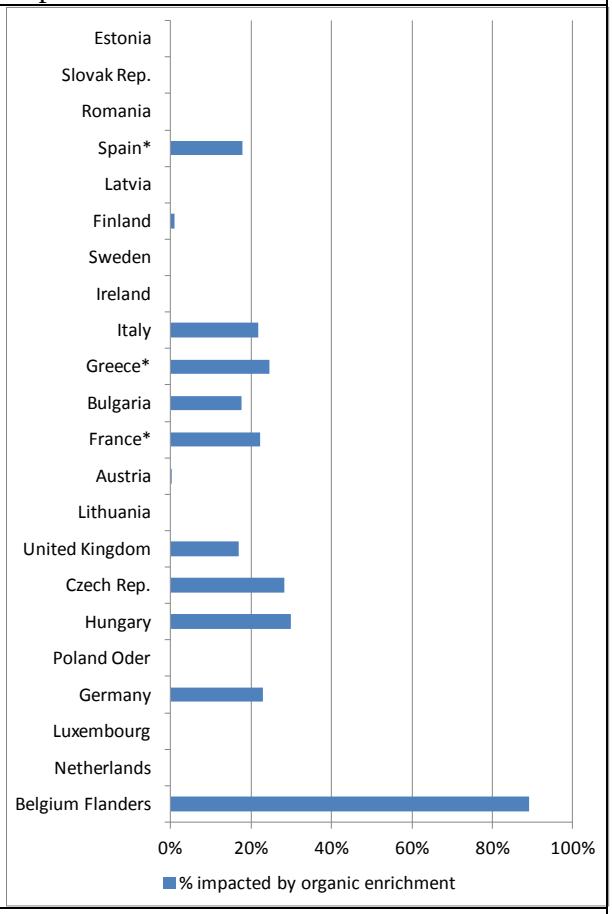
Rivers – percentage of water bodies with **nutrient enrichment** being an impact	Rivers – percentage of water bodies with **organic pollution/enrichment** being an impact
	
Excel sheet: impact_rivers.xlsx Notes: Based on rWBs with classified ecological status, total 61415 (water bodies from 15 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No impact data from Ireland; Lithuania, Luxembourg; The Netherlands, Poland Oder, Romania & Slovak Rep. Sorted by percentage of water bodies with at least good status	Excel sheet: impact_rivers.xlsx Notes: Based on rWBs with classified ecological status, total 61415 (water bodies from 15 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No impact data from Ireland; Lithuania, Luxembourg; The Netherlands, Poland Oder, Romania & Slovak Rep. Sorted by percentage of water bodies with at least good status

Figure 11.4.5. Proportion of total number of classified river water bodies reported to have significant impact from nutrient enrichment (left panel) and organic enrichment (right panel). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.4.1)

Organic enrichment (figure 11.4.5) is less important than nutrient enrichment in most countries, except Belgium (Flanders), where ca. 90% of classified river water bodies are

affected. It is unclear why the impact of organic enrichment in this country is reported to affect more classified river water bodies than those exposed to significant point source pollution (figure 11.4.3). The reasons for these inconsistencies are unclear, but probably relates to uncertainty in the pressures and impact assessments. In Spain, the Czech Republic, UK and Poland (Oder) the situation is opposite with many more rivers affected by point sources than by organic enrichment, which can be caused by other substances than organic matter, e.g. hazardous substances.

The largest impact of contamination by priority substances and contaminated sediment (figure 11.4.6) is reported for Sweden, UK and Belgium (Flanders). Also in France, Italy and the Czech Republic this impact is important, and is reported to affect 20-30% of all classified river water bodies. This impact will primarily affect chemical status, but may also affect ecological status/potential, and thus contribute to explain the high proportion of classified river water bodies in less than good ecological status/potential in these countries. For Sweden all classified river water bodies are affected by this impact, due primarily to diffuse mercury pollution. As Sweden has reported > 50% of their classified river water bodies to be in good or better status, this impact of Hg pollution is probably less important for ecological status than for chemical status.

Acidification (figure 11.4.6, note expanded x-axis) does not seem to be an important impact in any of the countries that have reported impacts. The maximum proportion of classified river water bodies affected by this impact is 15% and is found in Sweden, although acidification has been a much larger problem in previous decades. However, there are still a high number of classified river water bodies in Sweden that is affected by acidification (2400 of almost 16000 classified river water bodies). Other countries where this impact is reported to be significant in a small proportion of classified river water bodies are Finland (7%), UK (ca. 10%), the Czech Republic (6%) and Belgium (Flanders) (12%).

Interestingly the three countries reporting the largest impact of contamination (SE, UK, BE) are also those that report the most important impact of acidification.

Hydromorphological alterations (altered habitats) (figure 11.4.7) illustrates the importance of this impact in a large proportion of classified river water bodies in many Central European countries, especially in France, Austria, UK, the Czech Republic, Hungary and Germany. In these countries this impact corresponds to the high importance of hydromorphological pressures (figure 11.4.4). In other countries the importance of this impact is much lower than the proportion exposed to hydromorphological pressures, for example in Belgium (Flanders), where almost 80% are affected by hydromorphological pressures, and in Sweden, where 30% are affected by these pressures. The inconsistency between the pressures and impacts of hydromorphological changes reported by Belgium and Sweden indicates that either the reporting is inconsistent or that the hydromorphological pressures are not big enough to have significant impacts in terms of altered habitats. Poland and the Netherlands also reported a high proportion of rivers affected by these pressures, but as they did not report impacts, these pressures cannot be compared to this impact.

Other impacts (figure 11.4.7) are reported to be important particularly in UK and in the Czech Republic, as to somewhat lesser extent also in Latvia and Belgium (Flanders). *These other impacts are identified as alien species and climate change, as well as …… (check WISE).*

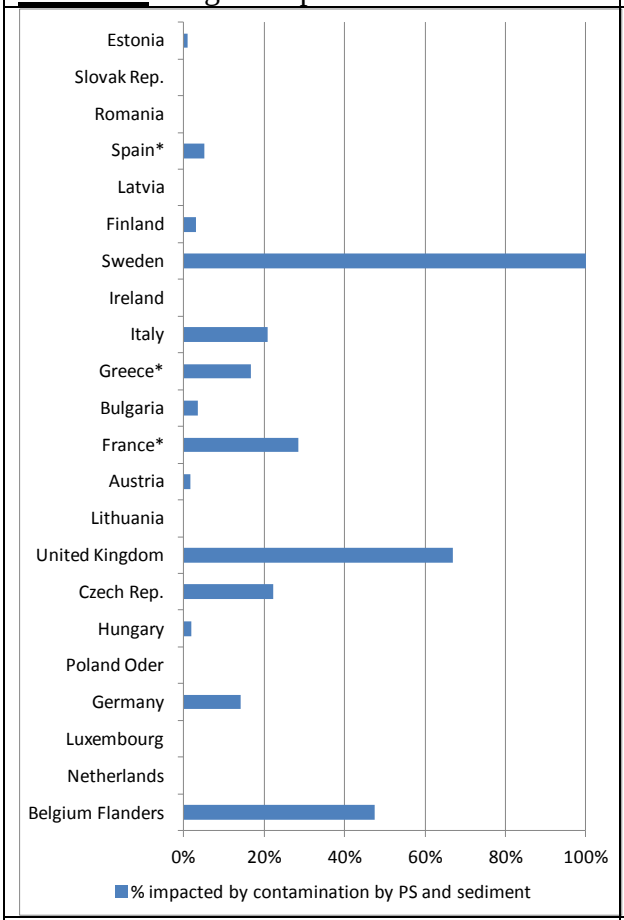
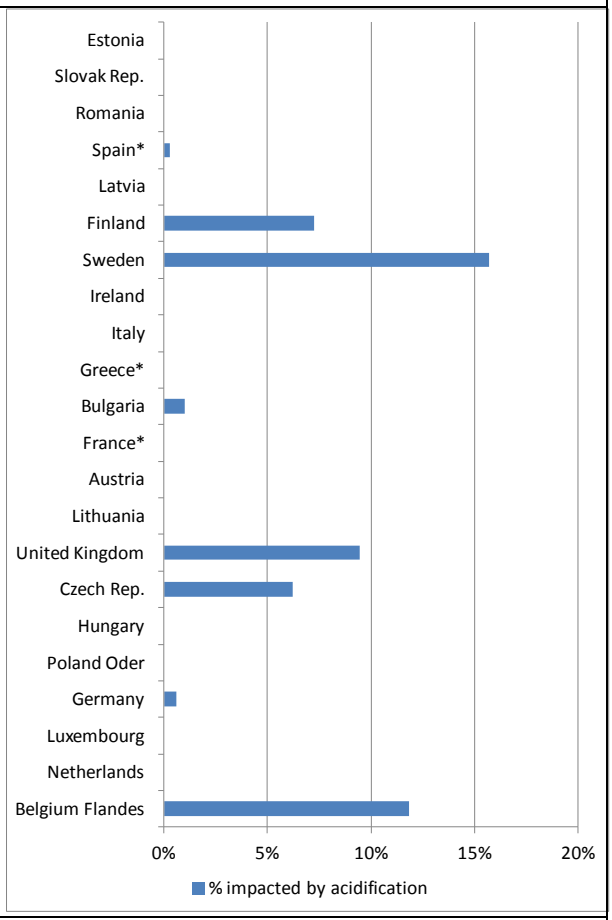
Rivers – percentage of water bodies with **contamination by priority substances and sediment** being an impact	Rivers – percentage of water bodies with **acidification** being an impact
	
Excel sheet: impact_rivers.xlsx Notes: Based on rWBs with classified ecological status, total 61415 (water bodies from 15 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No impact data from Ireland; Lithuania, Luxembourg; The Netherlands, Poland Oder, Romania & Slovak Rep. Sorted by percentage of water bodies with at least good status Calculated as WB impacted by PS plus sediment – should only be one count per WB	Excel sheet: impact_rivers.xlsx Notes: Based on rWBs with classified ecological status, total 61415 (water bodies from 15 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No impact data from Ireland; Lithuania, Luxembourg; The Netherlands, Poland Oder, Romania & Slovak Rep. Sorted by percentage of water bodies with at least good status Remark X-axis

Figure 11.4.6. Proportion of total number of classified river water bodies reported to have significant impact from contamination by priority substances and sediments (left panel) and acidification (right panel, note expanded x-axis). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.4.1)

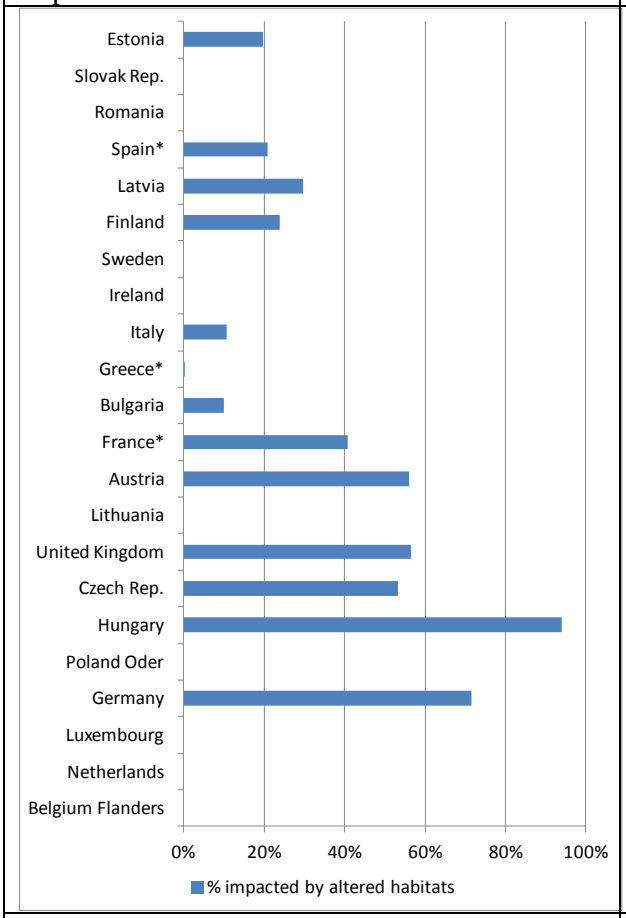
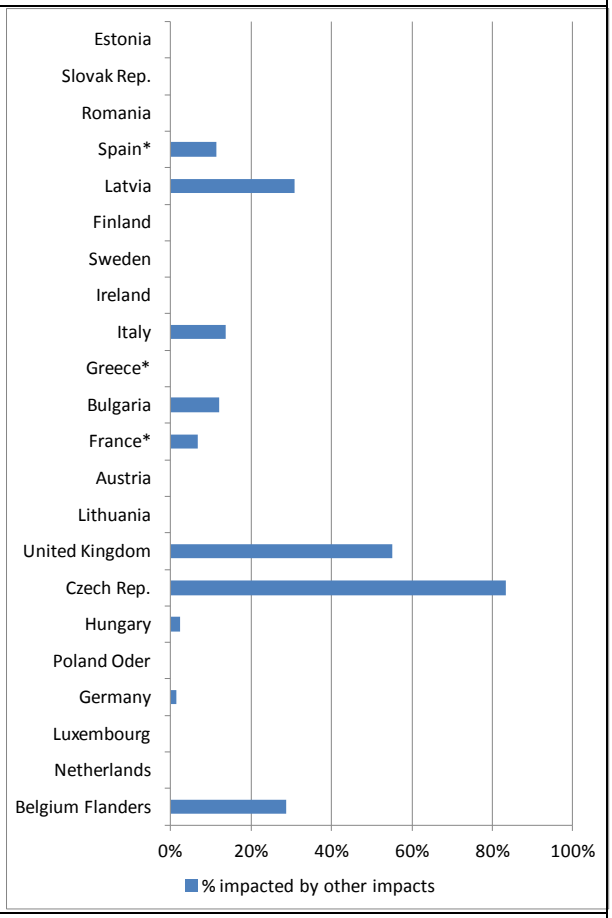
Rivers – percentage of water bodies with **hydromophological alterations** being an impact	Rivers – percentage of water bodies with other impact s
	
Excel sheet: impact_rivers.xlsx Notes: Based on rWBs with classified ecological status, total 61415 (water bodies from 15 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No impact data from Ireland; Lithuania, Luxembourg; The Netherlands, Poland Oder, Romania & Slovak Rep. Sorted by percentage of water bodies with at least good status	Excel sheet: impact_rivers.xlsx Notes: Based on rWBs with classified ecological status, total 61415 (water bodies from 15 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No impact data from Ireland; Lithuania, Luxembourg; The Netherlands, Poland Oder, Romania & Slovak Rep. Sorted by percentage of water bodies with at least good status

Figure 11.4.7. Proportion of total number of classified river water bodies reported to have significant impacts from hydromorphological alterations (left panel) and other impacts (right panel). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.4.1)

Rivers main assessment linking ecological status/potential with pressures and impacts

The worst ecological status/potential in European rivers is found in many of the Central-European countries, e.g. Germany, Poland (Oder RBD only), Luxembourg, the Netherlands and Belgium (Flanders only), Hungary, Czech Republic. Also in Austria, France, Lithuania and UK the majority of classified rivers is in less than good status.

The high proportion of classified river water bodies in less than good status in the Central European countries corresponds to high pressures from point and diffuse sources causing nutrient enrichment, as well as high pressures from hydromorphological changes causing altered habitats. These pressures and impacts are related to high population density and intensive agriculture in most of these countries.

Better ecological status/potential is found in Northern Europe, i.e. Sweden, Finland and the Baltic countries, except Lithuania, as well as in Spain, Slovakia and Romania. For the latter two countries the results are more uncertain (failing one or more data quality criteria, see section 11.2). Moreover, the classification systems in most countries were not fully developed, nor fully intercalibrated at the time of reporting, thereby contributing to high uncertainty in the assessments of ecological status/potential.

11.5. Lakes status, impacts and pressures by countries

Lakes ecological status and potential

The best ecological status / potential in lakes is found in Austria, Ireland and Finland, where > 75% of the total number of classified lake water bodies are in good or better ecological status/potential (figure 11.5.1). Also Lithuania, Estonia, Sweden and Italy have reported > 50% of their lake water bodies to be in good or better ecological status/potential. The results from Ireland and Italy are more uncertain, as they do not fulfil the data quality criteria (see chapter 11.2 above).

The worst ecological status / potential of classified lake water bodies are found in Belgium (Flanders), the Netherland and Greece, where > 90% of the total number are in less than good status/potential. In Poland (Oder RBD only), France, the Czech Republic and Romania 60-80% of lake water bodies are in less than good ecological status /potential. Also in Germany, UK, Spain, Latvia, Hungary and Bulgaria the majority of classified lake water bodies are reported to have less than good ecological status / potential.

The picture is more or less the same when assessing lakes by area (figure 11.5.1 right panel) instead of by number (figure 11.5.1 left panel). However, there are some exceptions: In Finland, Germany, Hungary, Bulgaria and Romania the ecological status or potential of classified lakes are better when considering lakes by area than by number. This result suggests that the largest lake water bodies dominating the total lake area in these countries are in better ecological status than the smaller lakes. Better status in large lake water bodies than in smaller lakes are to be expected, as the large lake water bodies often have larger volume of water to dilute the pollution coming from the catchment. There are also some countries where the picture is opposite, e.g. in Sweden, Estonia, Ireland and UK. Here the ecological status/potential is worse in the larger lake water bodies than in the smaller ones. The explanation may be that these countries have a large number of small lakes in upland

areas with less pressure, whereas their large lake water bodies are mainly located in lowland areas with higher pressures.

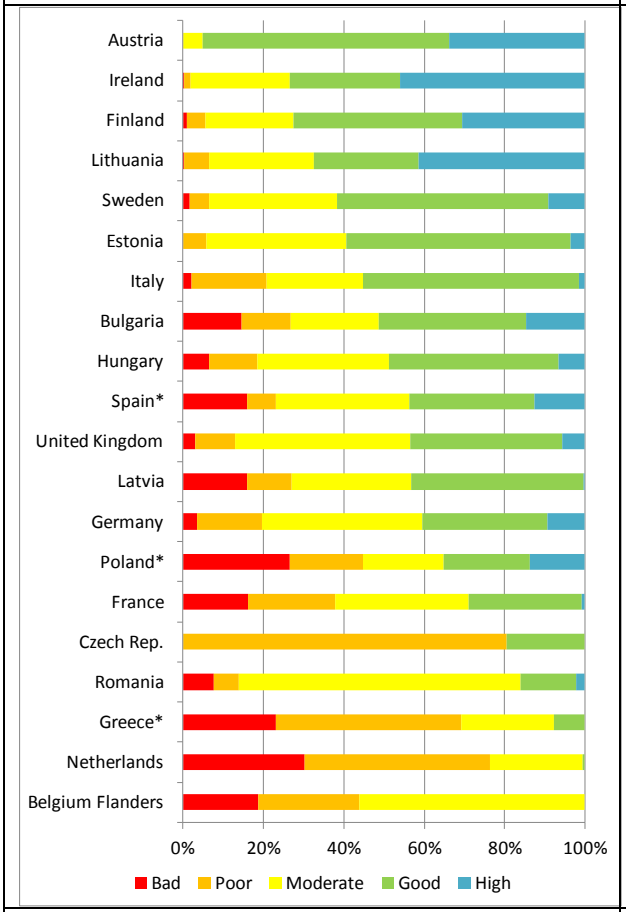
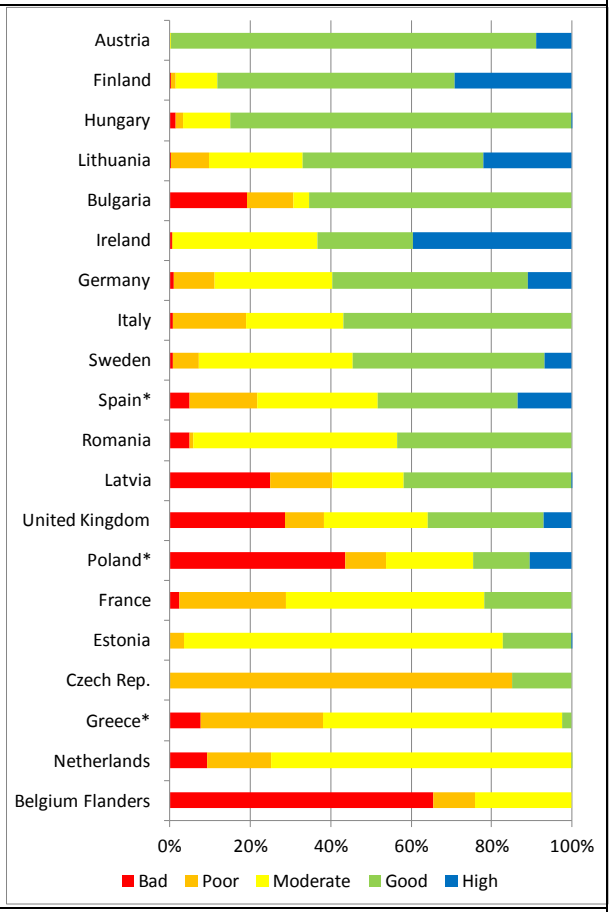
Lakes – good ecological status by count of water bodies	Lakes – good ecological status by lake areas
	
Excel sheet: pressures_lakes.xlsx Notes: Based on lWBs with classified ecological status, total 13503 water bodies from 20 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Ireland; Italy; Latvia; Lithuania; Netherlands; Poland Oder; Romania & Spain*; Sweden & United Kingdom. No lake water bodies reported for Luxembourg and Slovak Rep. Only water bodies with classified status included. Sorted by percentage of Water bodies with at least good status	Excel sheet: pressures_lakes.xlsx Notes: Based on lWBs with classified ecological status, total 76800 km2 lake area from 20 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Ireland; Latvia; Lithuania; Netherlands; Poland Oder; Romania & Spain*; Sweden & United Kingdom. No lake water bodies/area reported for Luxembourg and Slovak Rep. Only water bodies with classified status included. Sorted by percentage of water bodies with at least good status

Figure 11.5.1. Ecological status or potential of classified river water bodies in different countries sorted by proportion of good or better ecological status/potential. Left panel: % of total number of river water bodies, Right panel: % of total length of river water bodies.

Lakes pressures and impacts

The countries with the best ecological status or potential (upper part of figure 11.5.1) e.g. Austria and Finland also report the highest proportion of lake water bodies without significant pressure or impacts (blue part of country bar in figure 11.5.2). Ireland did not

report pressures nor impacts on lakes. Also in Lithuania, Sweden and Estonia the majority of classified lakes are without significant pressures and impacts, which is consistent with the ecological status /potential. Italy reported more pressures and impacts than the ecological status suggests. In the countries with the worst ecological status or potential (lower part of figure 11.5.1), the vast majority of classified lake water bodies are reported to have significant pressures and impacts (red bars in figure 11.5.2). Thus, the reporting of ecological status, pressures and impacts seem largely consistent in most countries. The exceptions are Poland, who reported considerably less pressures (25%) than their status suggests (65%), and UK, who reported more pressures and impacts (close to 80%) than their status suggests (55%).

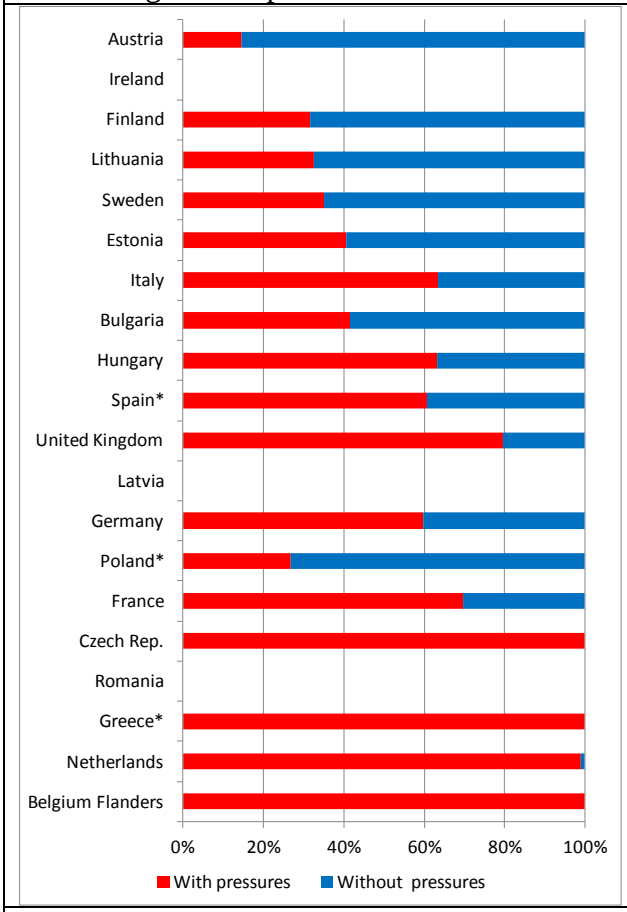
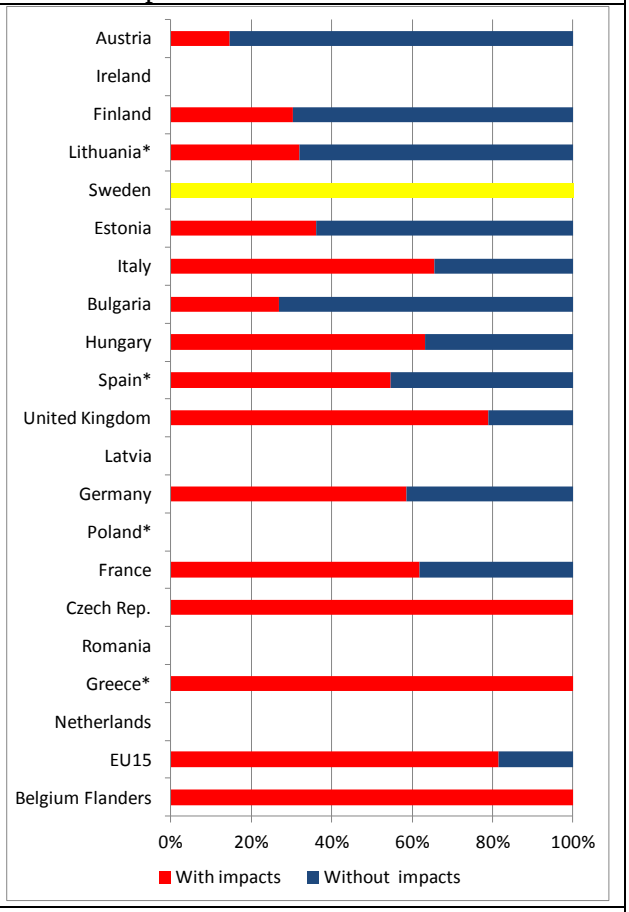
Lakes – proportion of water bodies with and without significant pressures	Lakes – proportion of water bodies with and without impacts
	
Excel sheet: pressures_lakes.xlsx Notes: Based on LWBs with classified ecological status total 12723 water bodies from 17 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Netherlands; Poland Oder; Spain*; Sweden & United Kingdom. No pressure data from Ireland; Latvia; & Romania.No lake data reported for: Luxembourg; & Slovak Rep. For Sweden only include diffuse pressures related to agriculture, abandoned industrial and mining and population not connected to sewers,	• Excel sheet: impact_lakes.xlsx • Notes: Based on LWBs with classified ecological status, total 11723 (incl. Sweden)/4527 water bodies from 15/14 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No lake water bodies reported for Luxembourg and Slovak Rep. All Swedish WBs have pressures from diffuse pollution do to mercury

Figure 11.5.2. Left panel: Proportion of total number of classified lake water bodies reported to be with or without significant pressures, Right panel:

Proportion of total number of classified lake water bodies reported to be with and without significant impacts.

Individual pressures in lakes

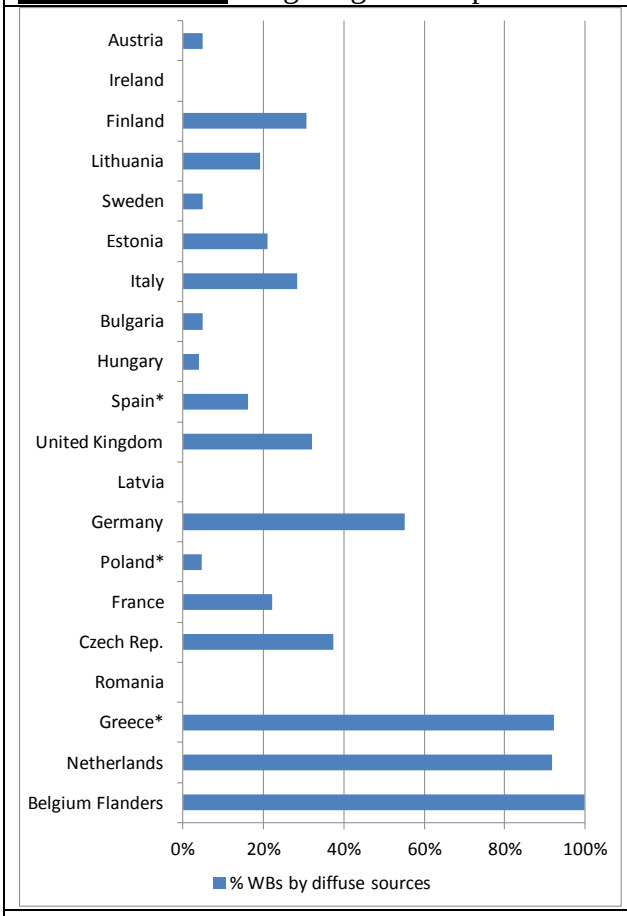
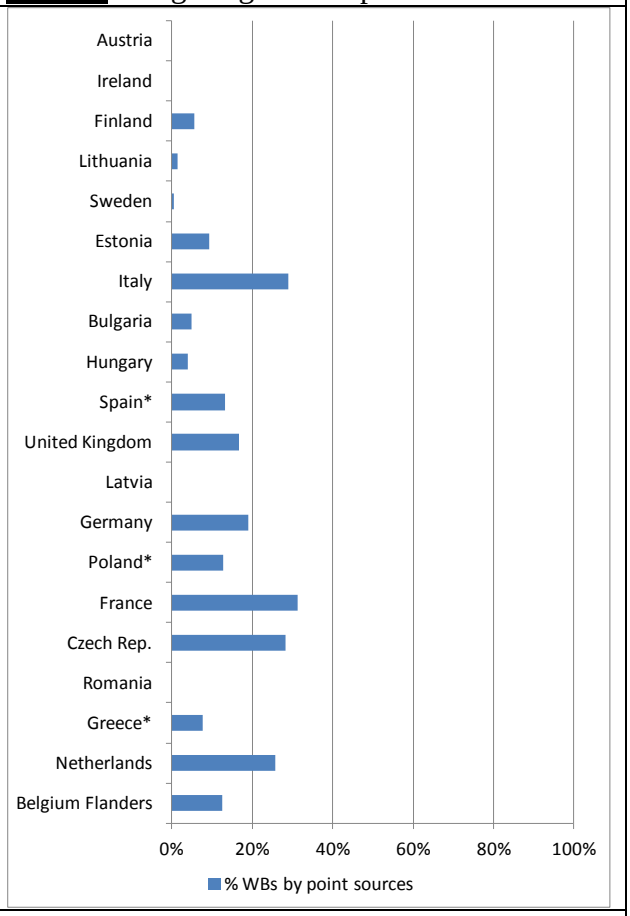
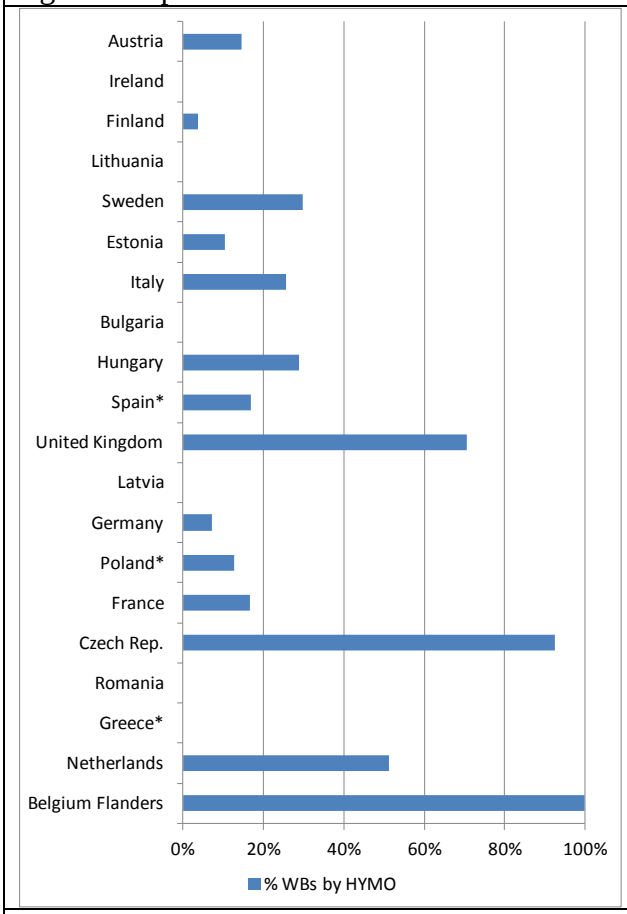
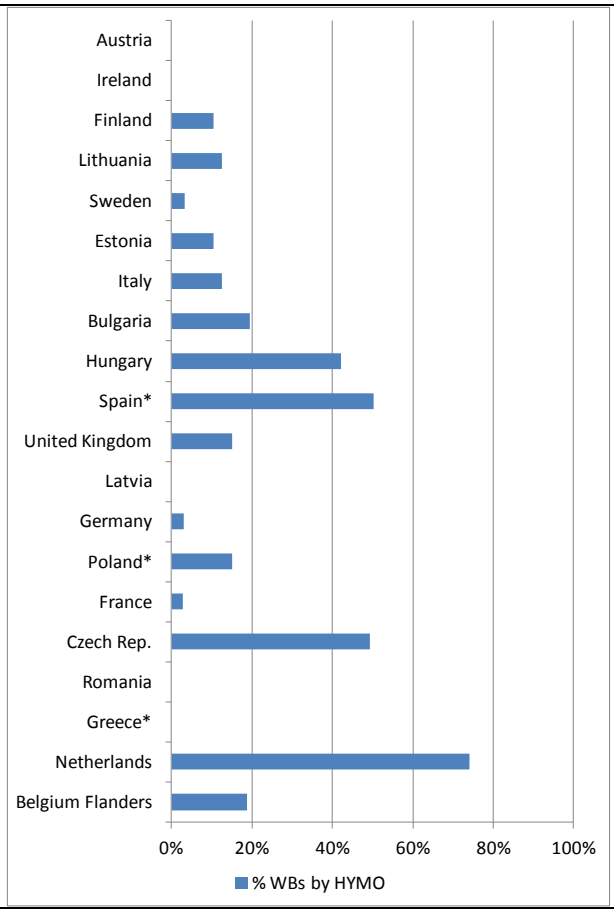
Lakes – percentage of water bodies with **diffuse sources** being a significant pressures	Lakes – percentage of water bodies with **point sources** being a significant pressures
	
Excel sheet: pressures_lakes.xlsx Notes: Based on LWBs with classified ecological status total 12723 water bodies from 17 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Netherlands; Poland Oder; Spain*; Sweden & United Kingdom. No pressure data from Ireland; Latvia; & Romania. No lake data reported for: Luxembourg; & Slovak Rep. For Sweden only include diffuse pressures related to agriculture, abandoned industrial and mining and population not connected to sewers, Sorted by percentage of water bodies with at least good status	• Excel sheet: pressures_lakes.xlsx • Notes: Based on LWBs with classified ecological status total 12723 water bodies from 17 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Netherlands; Poland Oder; Spain*; Sweden & United Kingdom. • No pressure data from Ireland; Latvia; & Romania. • No lake data reported for: Luxembourg; & Slovak Rep. Sorted by percentage of water bodies with at least good status

Figure 11.5.3. Proportion of total number of classified lake water bodies reported to have significant pressures from diffuse sources (left panel) and point sources (right panel). Countries are sorted according to % water bodies in good or better status (see figure 11.5.1)

Lakes– percentage of water bodies with **hydromorphological alterations** being a significant pressures	Lakes – percentage of water bodies with **other pressures** being a significant pressures
	
Excel sheet: pressures_lakes.xlsx Notes: Based on LWBs with classified ecological status total 12723 water bodies from 17 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Netherlands; Poland Oder; Spain*; Sweden & United Kingdom. No HYMO pressure data from Greece, Ireland & Romania • No lake data reported for: Luxembourg; & Slovak Rep. Hydromorphological pressures: Water flow regulations and morphological alterations Sorted by percentage of water bodies with at least good status	• Excel sheet: pressures_lakes.xlsx • Notes: Based on LWBs with classified ecological status total 12723 water bodies from 17 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Netherlands; Poland Oder; Spain*; Sweden & United Kingdom. • No pressure data from Ireland; Latvia; & Romania. No lake data reported for: Luxembourg; & Slovak Rep. Sorted by percentage of water bodies with at least good status

Other pressures: The Netherlands; Czech Rep., Spain and Hungary <check WISE electronic summary>

Figure 11.5.4. Proportion of total number of classified lake water bodies reported to have significant pressures from hydromorphological alterations (left panel) and other pressures (right panel). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.5.1)

Pollution from diffuse sources is a significant pressure in many countries affecting > 50% of all classified lake water bodies in Belgium (Flanders), the Netherlands, Germany and Greece (figure 11.5.3), which is probably related to a high level of intensive agriculture in these countries. The countries with the lowest proportion of classified lake water bodies exposed to pollution from diffuse sources are Austria, Sweden (Hg excl.), Bulgaria, Hungary and Poland (Oder). This is probably in line with low levels of intensive agriculture and low proportion of population not connected to sewage systems in Austria and Sweden, but is more difficult to explain for Bulgaria, Hungary and Poland (*text should be checked when a new figure on diffuse source pollution in different categories of % intensive agricultural land use is available*).

Point source pollution (figure 11.5.3) is seemingly less important in lakes than in rivers, with maximum 30% of classified lake water bodies being affected in Italy, France, Czech Republic and the Netherlands, suggesting good control of point source emissions to lakes in most countries.

Hydromorphological alterations including water flow regulations and morphological alterations are a significant pressure affecting most of all classified lake water bodies in UK, Czech republic and Belgium (Flanders), as well as ca. half of the classified lake water bodies in the Netherlands. In these countries hydromorphological alterations contribute to explain the large proportion of lake water bodies in less than good ecological status/potential. In Sweden, where the majority of classified lake water bodies is in good or better status, this pressure is significant in 30% of the classified lakes, which is more important than diffuse pollution, if excluding diffuse pollution of Hg. Hydromorphological alterations is therefore probably an important pressure in most of the lake water bodies in less than good ecological status/potential in Sweden. Hydromorphological alterations are affecting a larger proportion of classified lake water bodies than those affected by diffuse source pollution also in Austria, Hungary, UK, Poland and the Czech Republic. Conversely, diffuse pollution are reported to be more important than hydromorphological alterations in classified lakes in Finland, Estonia, Germany, France and the Netherlands.

Other pressures are important in the Netherlands, the Czech Republic, as well as in Spain and Hungary, (*WISE summary should be checked to identify what these other pressures are*).

Individual impacts in lakes

Nutrient enrichment (figure 11.5.5) is the most significant impact in classified lake water bodies, in particular in Hungary, Germany and Belgium (Flanders), and in Greece, where all the classified lake water bodies are affected (The Netherlands did not report impacts). In these countries this impact contributes to explain the large proportion of classified lake water bodies in less than good ecological status or potential. Nutrient enrichment also corresponds well with the high nutrient pressure from diffuse source pollution reported from these countries, with the exception of Hungary, who reported very low proportion of classified lake water bodies being affected by diffuse (as well as point) source pollution.

The least impact of nutrient enrichment is reported in Austria, Sweden, Bulgaria and Spain, where only 5-15% of classified lake water bodies are affected. For Austria, the low impact of nutrient enrichment corresponds to the low proportion of classified lake water bodies in less than good ecological status or potential, as well as to the low levels of diffuse and point source pollution reported. In Sweden, Bulgaria and Spain, the proportion of classified lake

water bodies in less than good status or potential is higher than the proportion impacted by nutrient enrichment and higher than those exposed to diffuse and point source pollution. The mismatch between ecological status/potential on one hand and nutrient enrichment or diffuse+point source pollution on the other hand is due to the importance of other impacts, e.g. acidification in Sweden (figure 11.5.6), and hydromorphological alterations in Spain (figure 11.5.7), causing altered habitats that negatively affect the ecological status/potential in their lakes. In Bulgaria, the most important impacts reported are organic enrichment, although this impact only affects ca. 20% of all classified lake water bodies in this country and thus cannot account for the ca. 50% that are reported to be in less than good ecological status/potential.

Organic enrichment (figure 11.5.5) is less important than nutrient enrichment in most countries, except Belgium (Flanders), where ca. 90% of classified lake water bodies are affected. It is unclear why the impact of organic enrichment in this country is reported to affect considerably more classified lake water bodies than those exposed to significant point source pollution (figure 11.5.3). Also in Greece, organic enrichment is important, affecting ca. half of the classified lake water bodies. France, Italy and the Czech Republic report organic enrichment for 20-30% of their classified lake water bodies, corresponding to similar data for point source pollution. In these countries the proportion of classified lake water bodies affected by organic enrichment is roughly the same as that reported for nutrient enrichment.

Contamination by priority substances and contaminated sediment (figure 11.5.6) are not important impacts in lakes, except in Sweden. In this country all classified lake water bodies are affected by this impact, caused primarily by diffuse mercury pollution. As Sweden has reported ca. 60% of their classified lake water bodies to be in good or better status, the impact of Hg pollution is probably less important for ecological status than for chemical status. In Belgium (Flanders) and Italy this impact is reported to affect ca. 20% of all classified lake water bodies, whereas in the other countries this impact is negligible for the large majority of classified lake water bodies.

Acidification (figure 11.5.6, note expanded x-axis) only seem to be an important impact for lakes in Belgium (Flanders), where >60% of classified lake water bodies are affected. The number of lake water bodies classified in Belgium is however only 18, meaning that only ca. 10 lakes are reported to be affected by acidification. The other countries reporting this impact are Sweden, UK and the Czech Republic, where respectively 20%, 15% and 5% of the classified lake water bodies are affected. It is important to note that acidification has been a much larger problem in these countries in previous decades. Moreover, as the number of classified lakes is high in Sweden, this impact is still important in a high number of classified lakes in this country (1400 of almost ca. 7000 classified lake water bodies).

Hydromorphological alterations (altered habitats) (figure 11.5.7) is important mainly in UK, Hungary and the Czech Republic. In the Czech Republic this impact is reported for all the classified lake water bodies, which is to be expected, as there are only heavily modified and artificial lakes in this country. In UK, this impact is reported to affect ca. 70% of all classified lake water bodies, corresponds to the high importance of hydromorphological pressures (figure 11.5.4), and also probably affecting the ecological status / potential in UK lakes. In other countries the importance of this impact is much lower than the proportion exposed to hydromorphological pressures, for example in Belgium (Flanders), where almost 70% are affected by hydromorphological pressures, while none are reported to be impacted by these

pressures, and in Sweden, where 30% are affected by hydromorphological alterations, but none are reported to be impacted by these pressures. The inconsistency between the pressures and impacts of hydromorphological changes reported by Belgium and Sweden indicates that either the reporting is inconsistent or that the hydromorphological pressures are not big enough to have significant impacts in terms of altered habitats. The Netherlands also reported a high proportion of lakes to be affected by these pressures, but as they did not report impacts, pressures cannot be compared to impacts.

Other impacts (figure 11.5.7) are reported to be important particularly in UK and the Czech Republic, as to somewhat lesser extent also in Italy and Spain. *These other impacts are identified as alien species and climate change, as well as …… (check WISE)*.

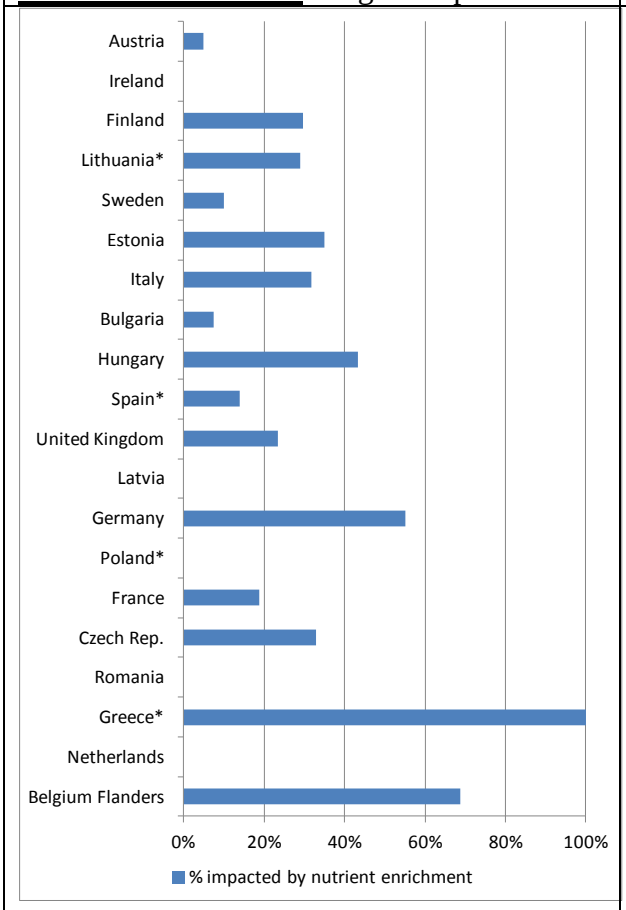
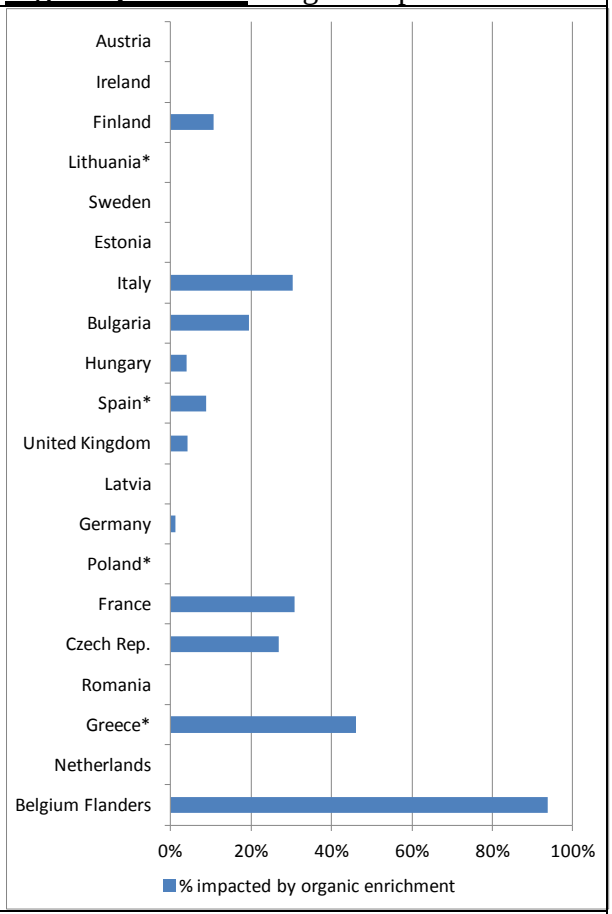
Lakes – percentage of water bodies with **nutrient enrichment** being an impact	Lakes – percentage of water bodies with **organic pollution** being an impact
	
Excel sheet: impact_lakes.xlsx Notes: Based on LWBs with classified ecological status, total 11723 water bodies from 15 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No lake water bodies reported for Luxembourg and Slovak Rep. Sorted by percentage of water bodies with at least good status	Excel sheet: impact_lakes.xlsx Notes: Based on LWBs with classified ecological status, total 11723 water bodies from 15 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No lake water bodies reported for Luxembourg and Slovak Rep. Sorted by percentage of water bodies with at least good status

Figure 11.5.5. Proportion of total number of classified lake water bodies reported to have significant impact from nutrient enrichment (left panel) and organic enrichment (right panel). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.5.1)

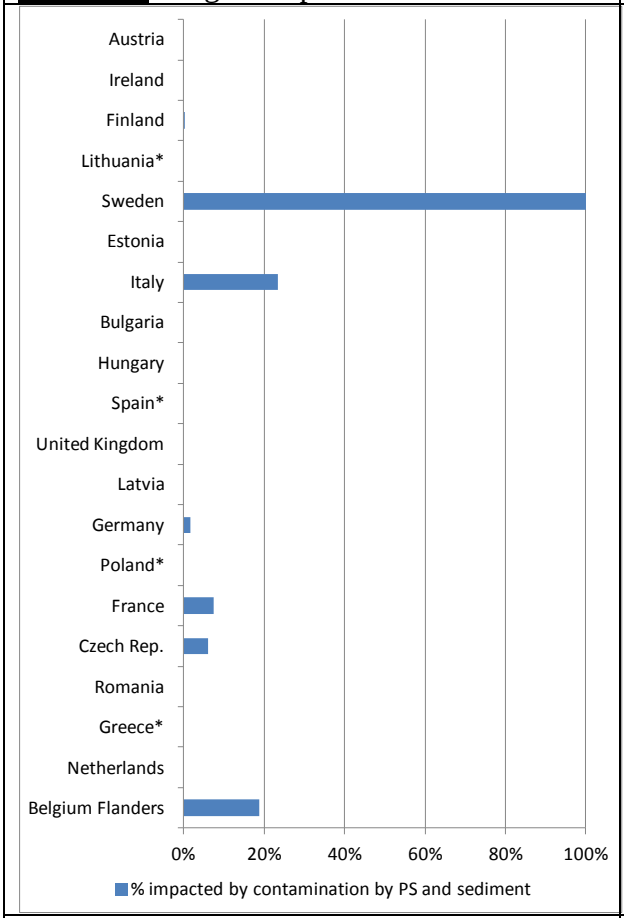
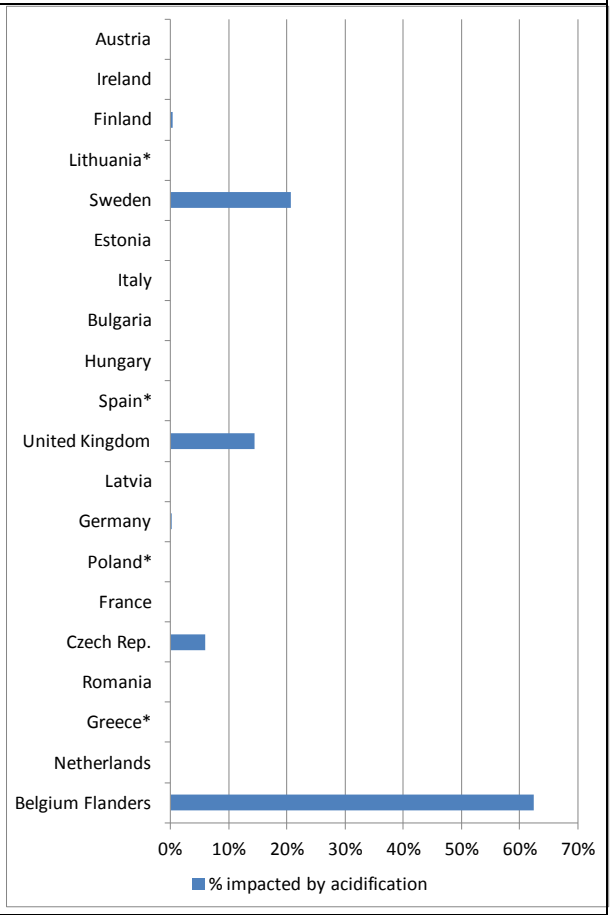
Lakes – percentage of water bodies with **contamination by priority substances and sediment** being an impact	Lakes – percentage of water bodies with **acidification** being an impact
	
Excel sheet: impact_lakes.xlsx Notes: Based on LWBs with classified ecological status, total 11723 water bodies from 15 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No lake water bodies reported for Luxembourg and Slovak Rep. Sorted by percentage of water bodies with at least good status	Excel sheet: impact_lakes.xlsx Notes: Based on LWBs with classified ecological status, total 11723 water bodies from 15 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No lake water bodies reported for Luxembourg and Slovak Rep. Sorted by percentage of water bodies with at least good status

Figure 11.5.6. Proportion of total number of classified lake water bodies reported to have significant impact from contamination by priority substances and sediments (left panel) and acidification (right panel, note expanded x-axis). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.5.1)

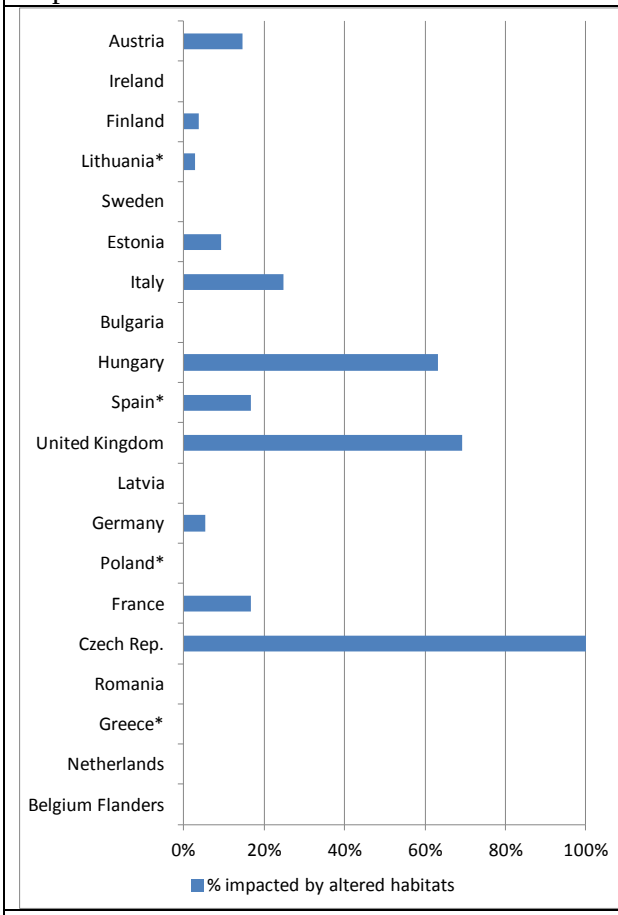
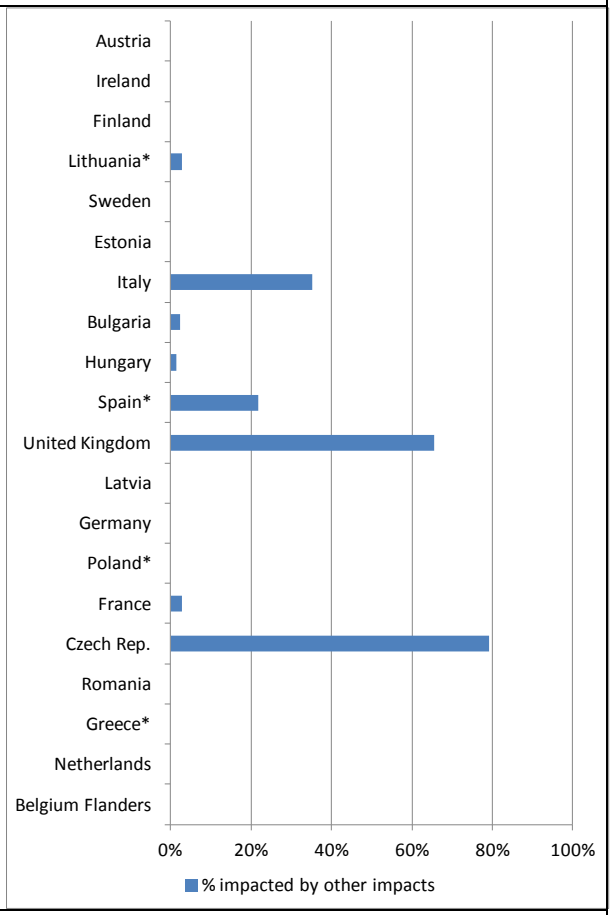
Lakes – percentage of water bodies with **hydromophological alterations** being an impact	Lakes – percentage of water bodies with **other impacts**
	
Excel sheet: impact_lakes.xlsx Notes: Based on LWBs with classified ecological status, total 11723 water bodies from 15 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No lake water bodies reported for Luxembourg and Slovak Rep. Sorted by percentage of water bodies with at least good status	Excel sheet: impact_lakes.xlsx Notes: Based on LWBs with classified ecological status, total 11723 water bodies from 15 EU Member States: Austria; Belgium Flanders; Bulgaria; Czech Rep; Estonia; Finland; France; Germany; Greece*; Hungary; Italy; Lithuania; Spain*; Sweden & United Kingdom. No lake water bodies reported for Luxembourg and Slovak Rep. Sorted by percentage of water bodies with at least good status

Figure 11.5.7. Proportion of total number of classified lake water bodies reported to have significant impacts from hydromorphological alterations (left panel) and other impacts (right panel). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.5.1)

Lakes main assessment linking ecological status/potential with pressures and impacts

The worst ecological status/potential in European lakes is found in the Netherlands, Belgium (Flanders only), Greece, Romania and the Czech Republic. Also in France, Poland (Oder), Germany, Latvia, Spain and Hungary the majority of classified lakes is in less than good ecological status or potential.

The high proportion of classified lake water bodies in less than good status in these countries corresponds to high pressures primarily from diffuse sources causing nutrient enrichment, as well as high pressures from hydromorphological changes causing altered habitats. These pressures and impacts are related to high population density and intensive agriculture in most of these countries, as well as to energy production (hydropower and cooling water for nuclear energy).

Better ecological status/potential is found in Austria, as well as in Northern Europe, i.e. Sweden, Finland and the Baltic countries, except Latvia.

However, the lake classification systems in most countries were not fully developed, nor fully intercalibrated at the time of reporting. The results reported should therefore be considered as preliminary with high uncertainty in the assessment of ecological status/potential.

11.6. Coastal waters

Ecological status and potential in coastal waters

51% of coastal waters are in high/good status. The best ecological status is found in Spain, Italy, Greece and United Kingdom, where more than 80% of reported classified water bodies are in high/good status. Ireland, France and Malta have also reported more than 50% of their water bodies with high/good status. Results are not certain for Italy, because only 10% of their coastal waters were reported as classified.

49% of coastal waters are in less than good status. There are five countries where all coastal waters are not reaching environmental objectives (Netherlands, Latvia, Romania, Poland and Lithuania). High percentage of water bodies in less than good status is reported also for Germany, Finland and Sweden. (Figure 11.6.1)

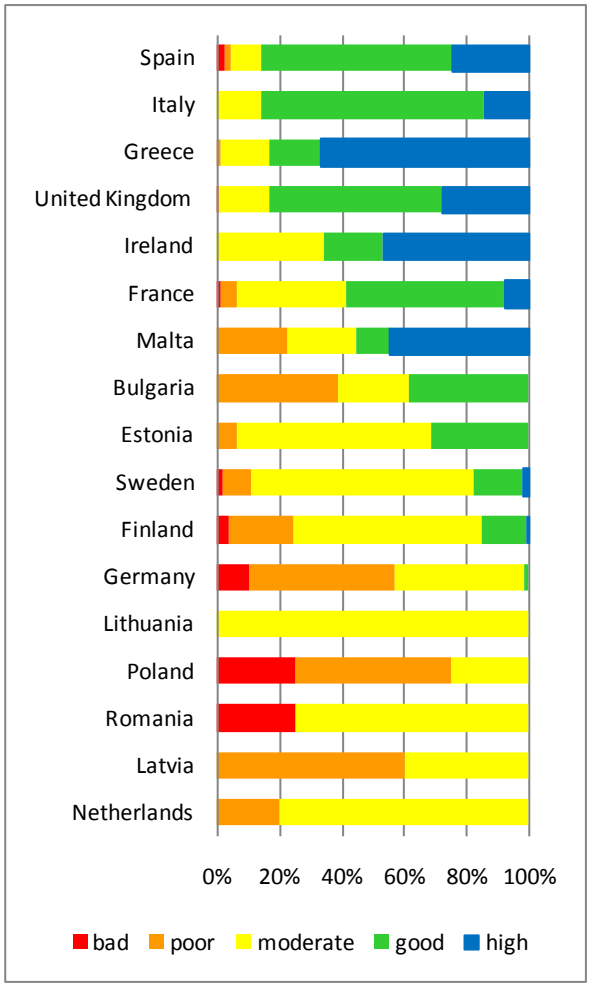
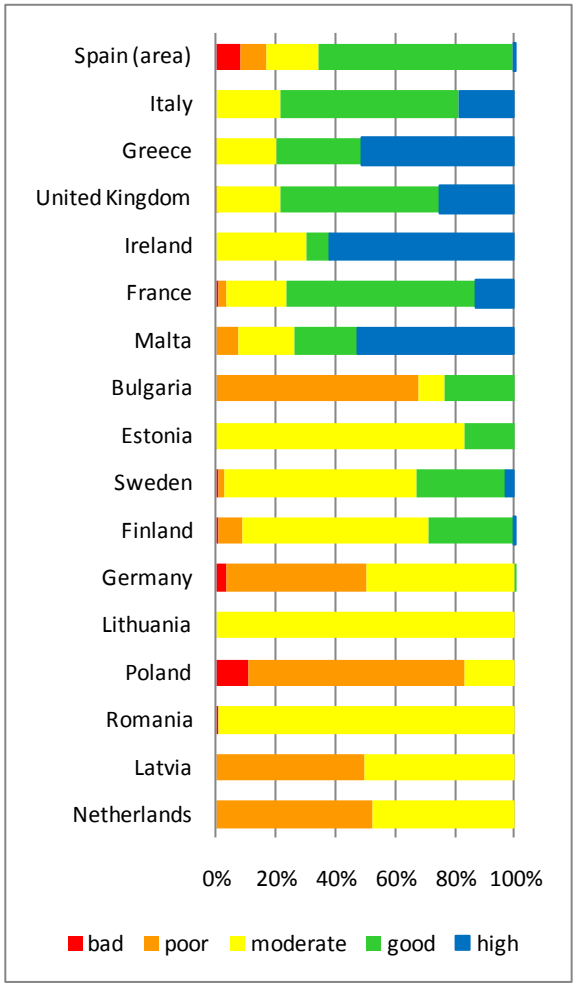
Coastal waters – good ecological status by count of water bodies	Coastal waters – good ecological status by area
	
Excel sheet: EcoStatus by count CW and TW by country.xls Notes: based on classified ecological status, 2192 water bodies was reported from 17 EU member states: Netherlands, Latvia, Romania, Poland, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain Only classified waters included Sorted by percentage of water bodies in high and good status (by count)	EcoStatus by count CW and TW by country.xls Notes: based on classified ecological status, 1814555 km2 coastal waters were reported from 17 EU member states: Netherlands, Latvia, Romania, Poland, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain Only classified waters included Sorted by percentage of water bodies in high and good status (by count)

Figure 11.6.1. Ecological status or potential of classified coastal water bodies in different countries sorted by proportion of good or high ecological status/potential. Left panel: % of total number of coastal water bodies, Right panel: % of total area of coastal water bodies.

Pressures and impacts in coastal waters by country

Countries with best ecological status Spain, Greece, United Kingdom, Ireland, France and Malta reported lowest percentage of detected impacts and pressures in their waters, except for Italy, where the link between status, pressures and impacts is not clear since high percentage of waters with pressures and impacts is reported. Typically, countries with largest percentage of waters reported highest percentage of pressures and impacts. (Figure 11.6.2)

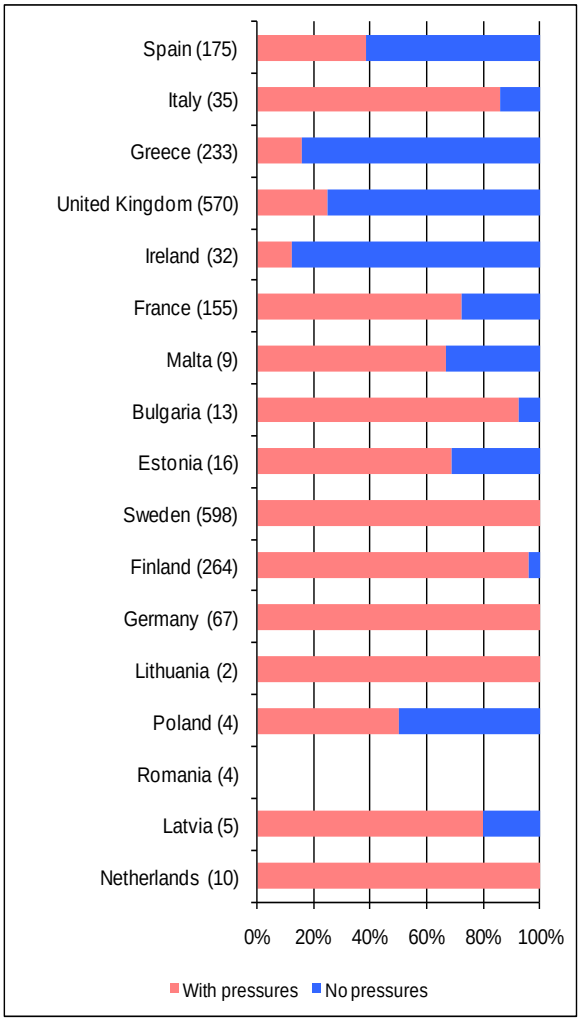
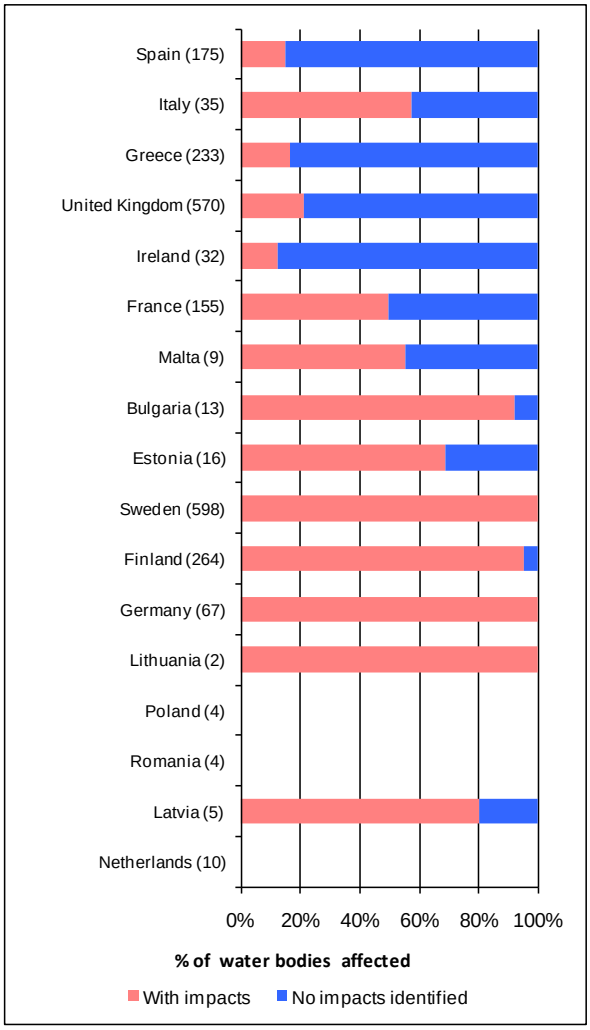
Coastal waters – proportion of water bodies with and without significant pressures	Coastal waters – proportion of water bodies with and without impacts
	
Excel sheet: TCW pressures.xls Notes: based on classified ecological status, pressures for 1356 water bodies was reported from 17 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count) All Swedish WBs have pressures from diffuse pollution do to mercury	Excel sheet: TCW impacts.xls Notes: based on classified ecological status, pressures for 1499 coastal water bodies was reported from 14 EU member states: Latvia, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No impacts were reported for: Netherlands, Romania and Poland. Sorted by percentage of water bodies in high and good status (by count) All Swedish WBs have pressures from diffuse pollution do to mercury

Figure 11.6.2. Left panel: Proportion of total number of classified coastal water bodies reported to be with or without significant pressures, Right panel:

Proportion of total number of classified coastal water bodies reported to be with and without significant impacts.

Individual pressures

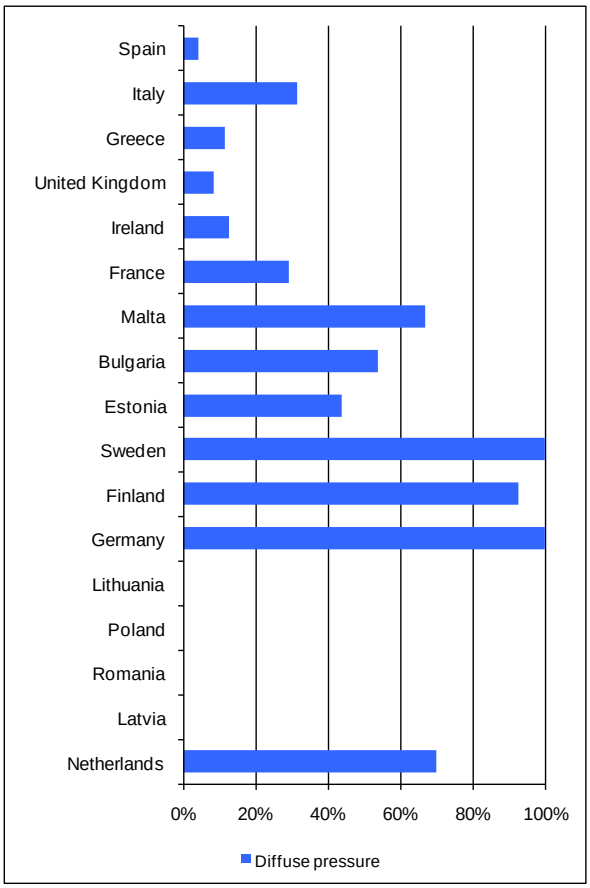
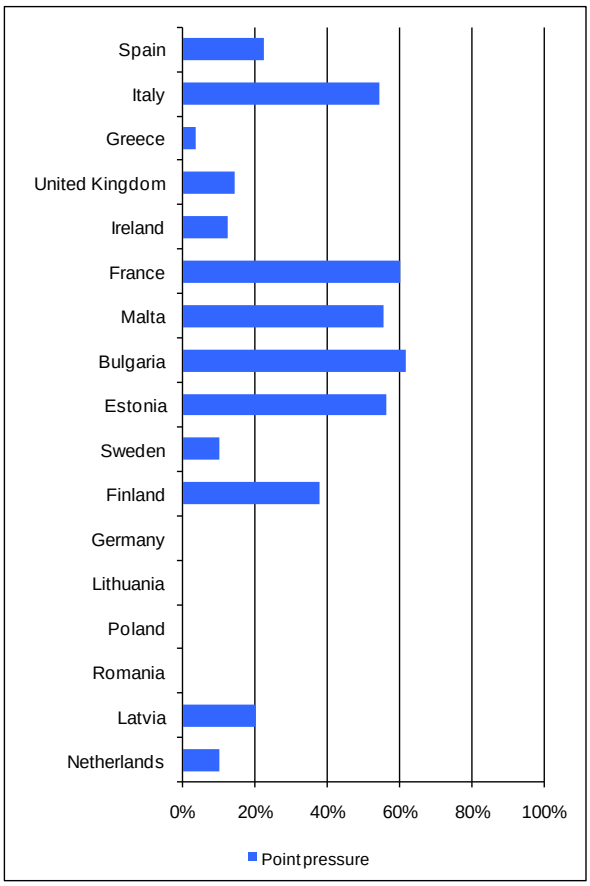
Coastal waters – proportion of water bodies with significant diffuse pressures	Coastal waters – proportion of water bodies with significant point source pressures
	
Excel sheet: TCW pressures.xls Notes: based on classified ecological status, pressures for 1356 water bodies was reported from 17 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count) Sweden should be diffuse pressure other than mercury in next version	Excel sheet: TCW pressures.xls Notes: based on classified ecological status, pressures for 1356 water bodies was reported from 17 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count)

Figure 11.6.3. Proportion of total number of classified coastal water bodies reported to have significant pressures from diffuse sources (left panel) and point sources (right panel). Countries are sorted according to % water bodies in good or better status (see figure 11.6.1)

Diffuse sources are reported as significant in 49% of EU coastal waters. Significant diffused pressures were reported for all coastal waters in Sweden and Germany and 92% of waters in Finland. More than 50% of waters in Malta, Bulgaria and Netherlands are also exposed to diffuse pressures. (Figure 11.6.3 left)

19% of coastal waters are reported to have significant pressures from point sources. Between 50% - 60% of waters in Italy, France, Malta, Bulgaria and Estonia are reported to have significant pressures from point sources. (Figure 11.6.3 right)

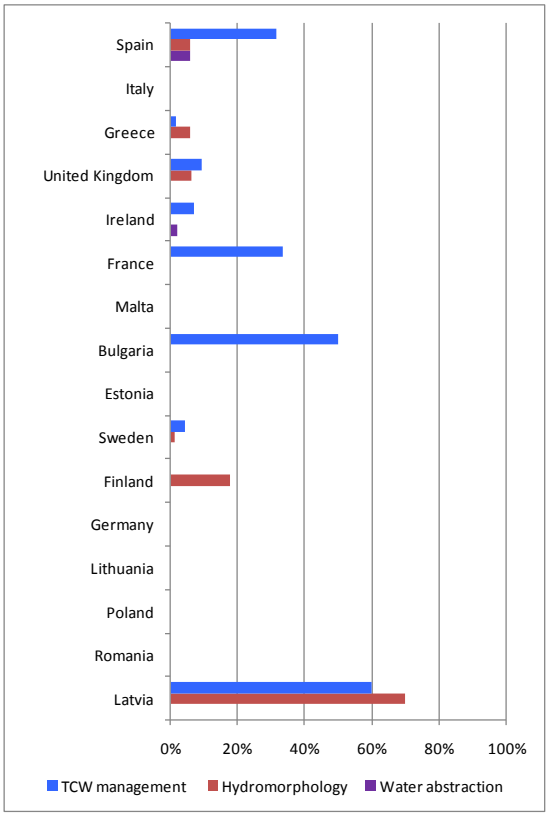
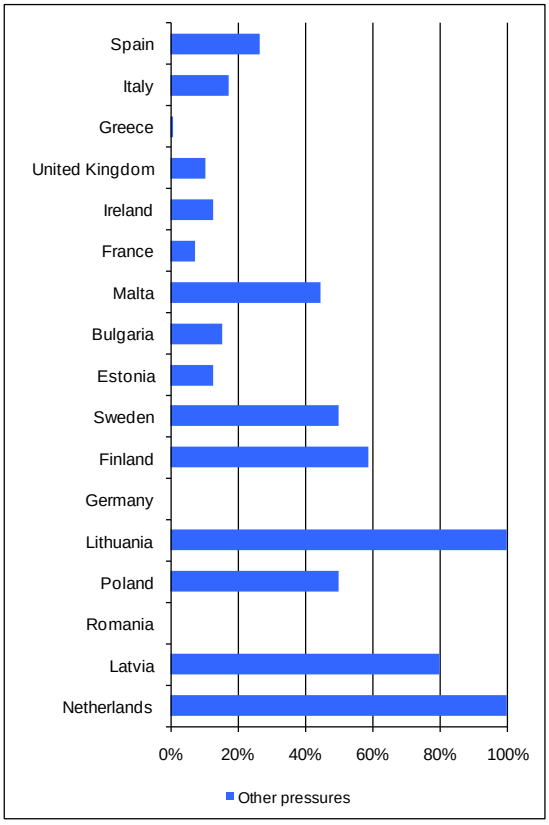
Coastal waters – proportion of water bodies with significant hydromorphological alterations pressures (Netherlands is missing, but will be added in next version)	Coastal waters – proportion of water bodies with other pressures
	
Excel sheet: TCW pressures.xls Notes: based on classified ecological status, pressures for 1356 water bodies was reported from 17 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count)	Excel sheet: TCW pressures.xls Notes: based on classified ecological status, pressures for 1356 water bodies was reported from 17 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count)

Figure 11.6.4. Proportion of total number of classified coastal water bodies reported to have significant pressures from hydromorphological alterations, TCW management and water abstractions (left panel) and other pressures (right panel). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.6.1)

Overall 7% of coastal waters are reported to have significant pressures due to hydromorphological alterations, water abstraction and other alterations due to management of coastal zone. Largest percentage of waters exposed to these pressures is reported by Latvia (60-70%) and Bulgaria (50%).(Figure 11.6.4, left)

‘Other pressures’ are reported in almost 28% of waters, but it is not identified what kind of pressures are included in this group. Netherlands and Lithuania reported all their waters as a subject to other pressures. More than 50% of waters exposed to other pressures are also reported for Latvia, Finland, Sweden, Poland and Malta. (Figure 11.6.4, right)

Individual impacts

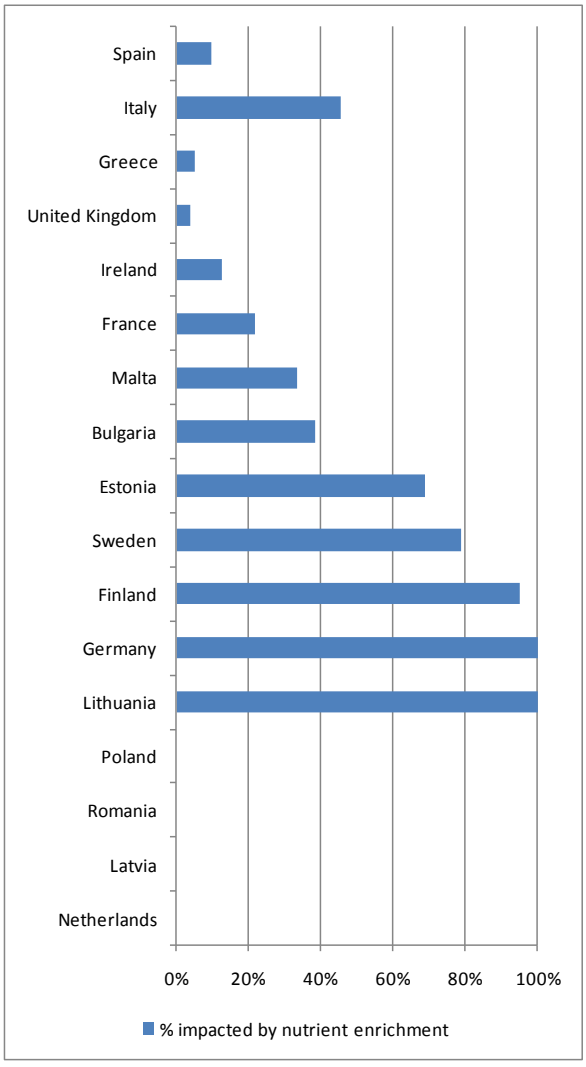
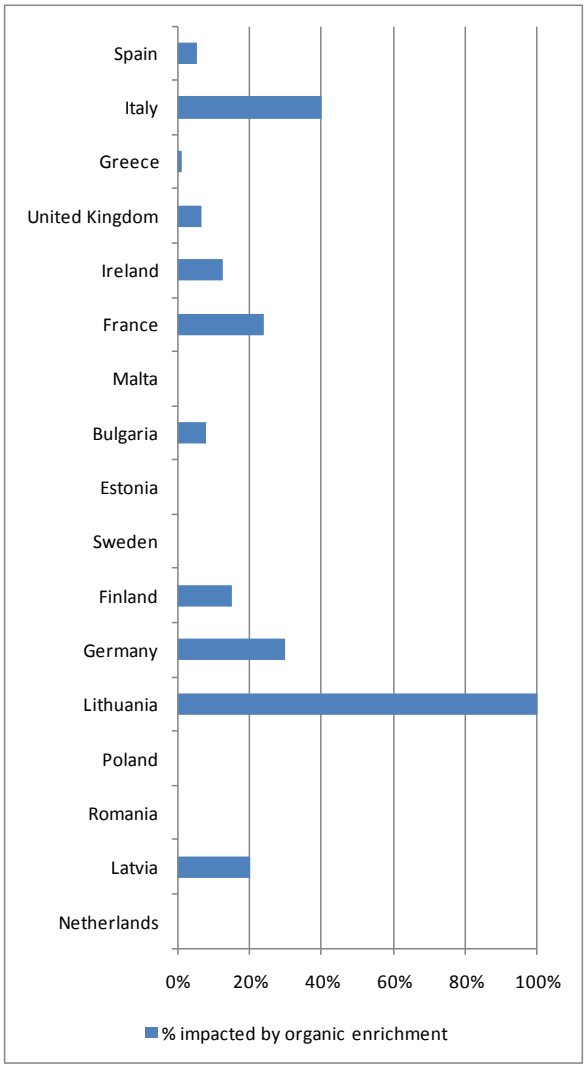
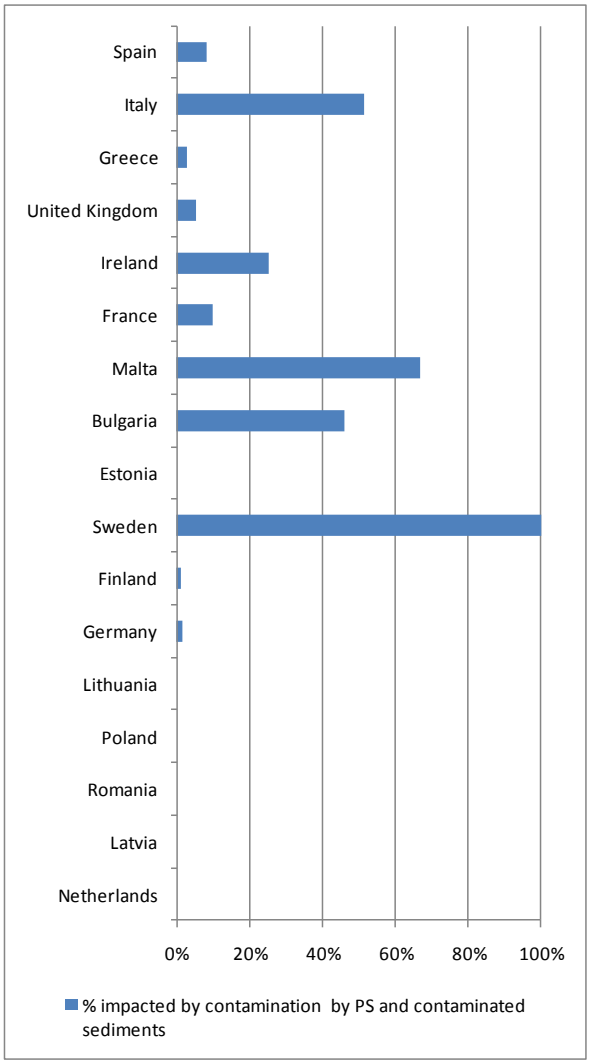
Coastal waters – proportion of water bodies with significant nutrient enrichment	Coastal waters – proportion of water bodies with significant organic enrichment
	
Excel sheet: TCW impacts.xls Notes: based on classified ecological status, pressures for 1499 coastal water bodies was reported from 14 EU member states: Latvia, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain Sorted by percentage of water bodies in high and good status (by count) Only classified water bodies are included No impacts were reported for: Netherlands, Romania and Poland. Sorted by percentage of water bodies in high and good status (by count)	Excel sheet: TCW impacts.xls Notes: based on classified ecological status, pressures for 1499 coastal water bodies was reported from 14 EU member states: Latvia, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain Sorted by percentage of water bodies in high and good status (by count) Only classified water bodies are included No impacts were reported for: Netherlands, Romania and Poland. Sorted by percentage of water bodies in high and good status (by count)

Figure 11.6.5. Proportion of total number of classified coastal water bodies reported to have significant impact from nutrient enrichment (left panel) and organic enrichment (right panel). Countries are sorted according to proportion of water bodies in high/good status (see figure 11.6.1)

Overall, nutrient enrichment is reported as major pan-EU problem, reported as significant in 42% of coastal waters (including all classes from high to bad). Lithuania and Germany reported all their waters as impacted by nutrient enrichment and Finland reported 95% of waters having this problem. More than 50% of waters are a subject to nutrient enrichment also in Estonia and Sweden.

Organic enrichment was overall reported as a problem in 7% of coastal waters. All waters in Lithuania are reported as impacted by organic enrichment, while other countries mostly reported this to be a problem in les then 20% of their waters.

Coastal waters – proportion of water bodies with significant contamination by priority substances and contaminated sediments	
	
Excel sheet: TCW impacts.xls Notes: based on classified ecological status, pressures for 1499 coastal water bodies was reported from 14 EU member	

states: Latvia, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain Sorted by percentage of water bodies in high and good status (by count) Only classified water bodies are included No impacts were reported for: Netherlands, Romania and Poland. Sorted by percentage of water bodies in high and good status (by count)	

Figure 11.6.6. Proportion of total number of classified coastal water bodies reported to have significant impact from contamination by PS and contaminated sediment (left panel). Countries are sorted according to proportion of water bodies in high/good status (see figure 11.6.1)

The second most significant impact reported in coastal waters is contamination by priority substances and contaminated sediments, reported as a problem in 31% of coastal waters. Sweden reported all their waters as impacted by priority substances (mercury).
50% and more of waters as a subject of contamination by priority substances were reported by Italy, Bulgaria and Malta. (Figure 11.6.6. left)
Acidification was not reported as a significant issue in many countries. Only United Kingdom, Ireland and Finland reported areas, impacted by acidification. (Figure 11.6.6. right)

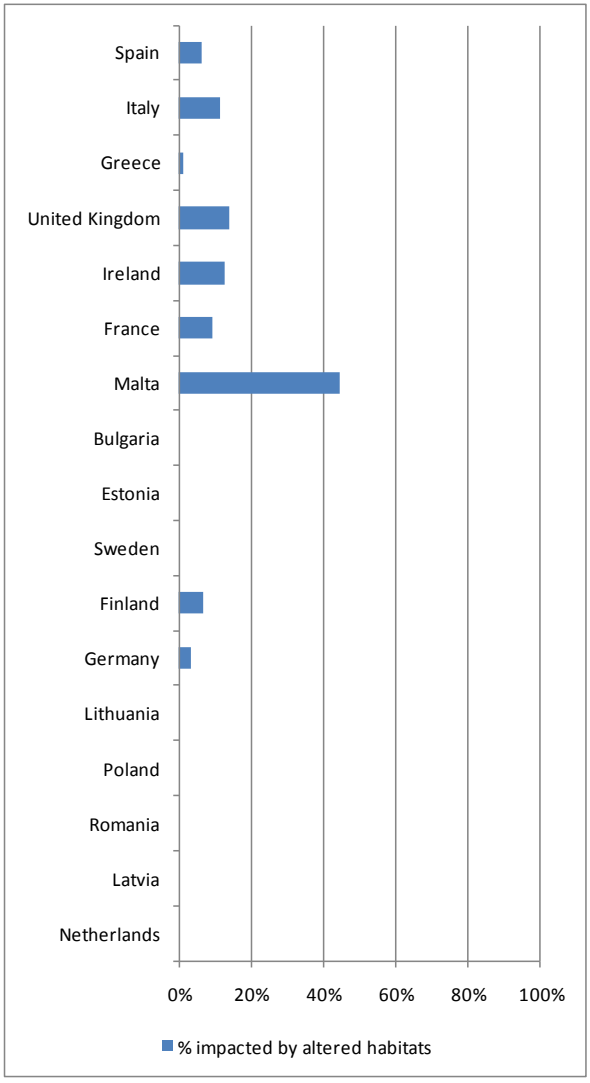
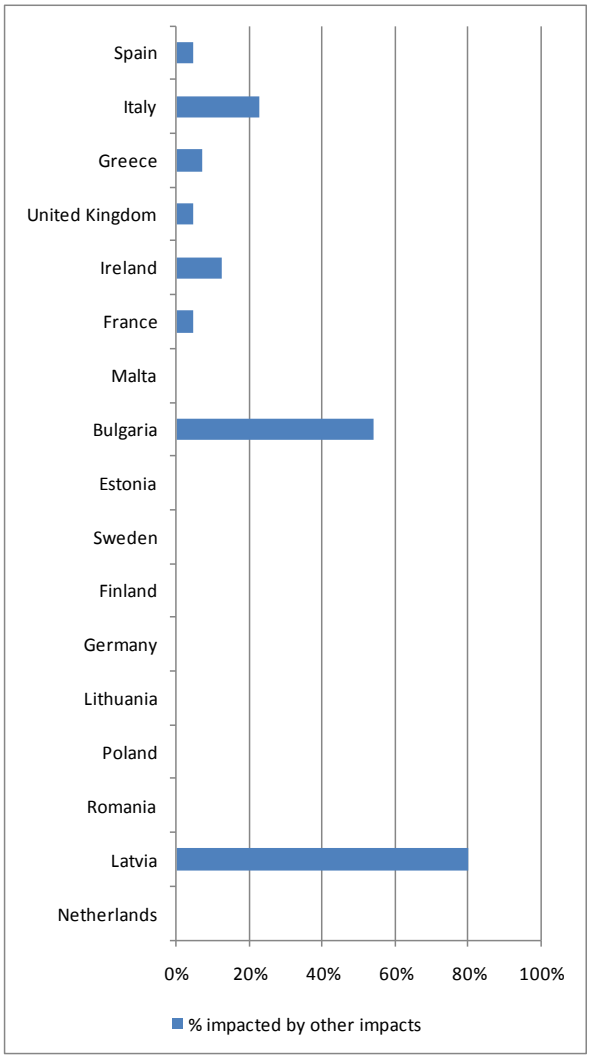
Coastal waters – proportion of water bodies with significantly altered habitats	Coastal waters – proportion of water bodies with significant other impacts
	
Excel sheet: TCW impacts.xls Notes: based on classified ecological status, pressures for 1499 coastal water bodies was reported from 14 EU member states: Latvia, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain Sorted by percentage of water bodies in high and good status (by count) Only classified water bodies are included No impacts were reported for: Netherlands, Romania and Poland. Sorted by percentage of water bodies in high and good status (by count)	Excel sheet: TCW impacts.xls Notes: based on classified ecological status, pressures for 1499 coastal water bodies was reported from 14 EU member states: Latvia, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain Sorted by percentage of water bodies in high and good status (by count) Only classified water bodies are included No impacts were reported for: Netherlands, Romania and Poland. Sorted by percentage of water bodies in high and good status (by count)

Figure 11.6.7. Proportion of total number of classified coastal water bodies reported to have significantly altered habitats (left panel) and other impacts (right panel). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.6.1)

Overall, 6% of coastal waters have been reported to have altered habitats. Malta reported the highest percentage of altered habitats (44%). Other countries reported less than 15% of alterations in coastal waters.

Other significant impacts were reported largely in Latvia (80%) and Bulgaria (53%).

Coastal waters main assessment linking ecological status/potential with pressures and impacts

51% of coastal waters are in high/good status. The best ecological status is found in Spain, Italy, Greece and United Kingdom, where more than 80% of reported classified water bodies are in high/good status. 49% of coastal waters are in less than good status. There are five countries where all coastal waters are not reaching environmental objectives (Netherlands, Latvia, Romania, Poland and Lithuania).

Pressures and impacts were reported from most countries and are identified to be present in waters from high to bad status. Several water bodies in high and good status do not have significant impacts and pressures, which is in according to expectations in reference to their status. (Figure 11.6.8.) Diffuse sources are the main pressures causing bad status of coastal waters, followed by 'other pressures', which are not specified and by point sources as the third group. Diffuse sources are reported as significant in 90% of coastal waters in less than good status. Second most important pressure is emissions from point sources, present on 18% of waters. Point sources are present on 11% of coastal waters in less than good status.

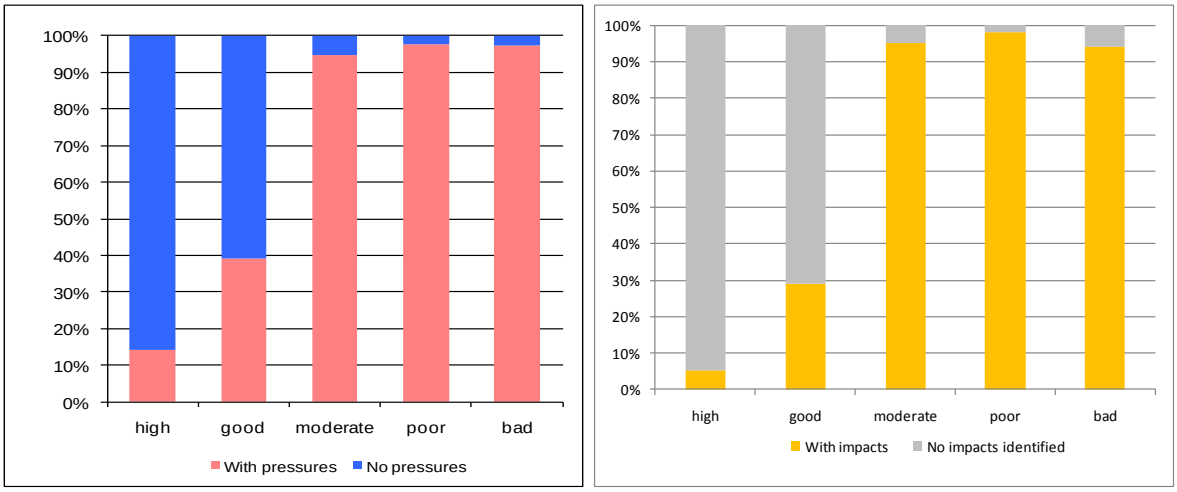


Figure 11.6.8. Ecological status or potential and link to pressures **(left panel); ecological status and potential and link to impacts (right panel). Percentage of water bodies by count**

Nutrient enrichment, contamination by priority substances and organic enrichment are the most important impacts in coastal waters with bad status. Overall, nutrient enrichment is reported as significant in 42% of coastal waters (including all classes from high to bad). More than 80% of water bodies in less than good status are a subject of nutrient enrichment, while waters in bad status are all exposed to nutrient enrichment.

The second most significant impact reported in coastal waters is contamination by priority substances, reported as a problem in 31% of waters. Organic enrichment and contamination

by PS are also present in waters with less than good status in high percentage. More than 60% of waters are subject to combination of impacts, which makes it difficult to identify the most important one. (

Category ‘Other pressures’ is also an important category, but it is not clear what countries reported under this issue. ‘Other pressures are present on 22% of coastal waters in less than good status.

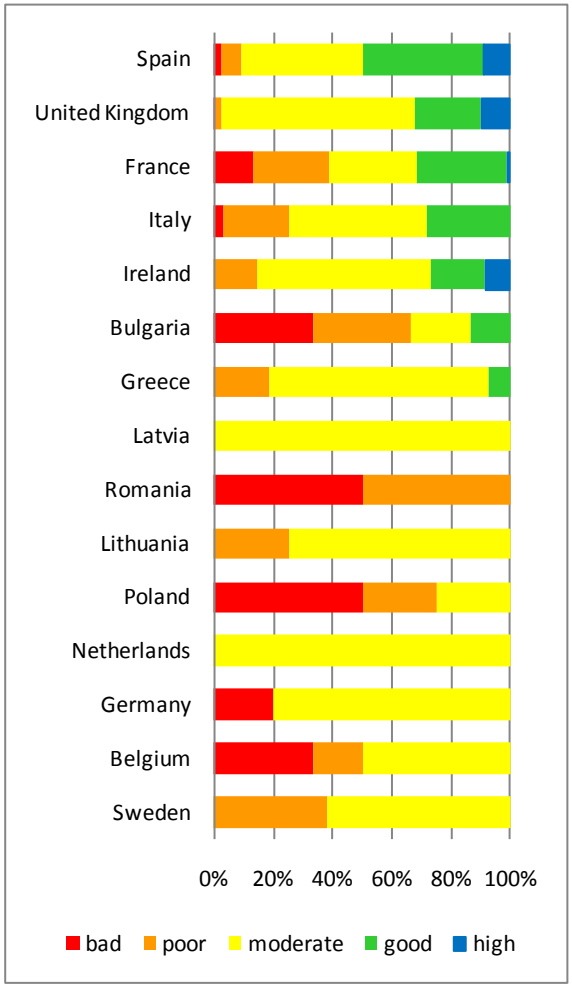
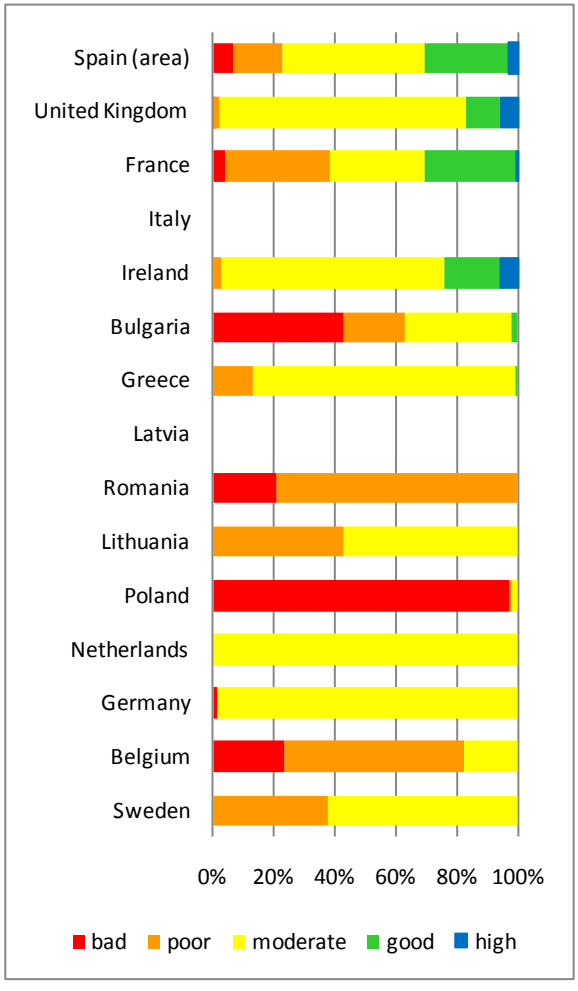
Linkage among status, pressures and impacts are mostly visible from the analysis of reported data.

11.7. Transitional waters

Status of transitional waters by country

32% of transitional waters are in high/good status. The best ecological status is found in Spain, United Kingdom, France, Italy and Ireland, but even there only 20-50% of transitional waters are reaching the environmental objective.

68% of transitional waters are in less than good status. There are eight countries where all transitional waters are in less than good status (Sweden, Belgium (Flanders), Germany, Netherlands, Poland, Romania and Latvia). High percentage of water bodies in less than good status is reported also for Greece and Bulgaria (more than 80%). (Figure 11.7 .1)

Transitional waters – good ecological status by count of water bodies	Transitional waters – good ecological status by river by area
	
Excel sheet: EcoStatus by count CW and TW by country.xls Notes: based on classified ecological status, 624 water bodies was reported from 15 EU member states: Sweden, Belgium Flanders, Germany, Netherlands, Poland, Lithuania, Romania, Latvia, Greece, Bulgaria, Ireland, Italy, France, United Kingdom, Spain	EcoStatus by count CW and TW by country.xls Notes: based on classified ecological status, 14283 km2 of transitional waters was reported from 14 EU member states: Netherlands, Romania, Poland, Lithuania, Germany, Finland, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Spain Only classified waters included Latvia did not report area, data from Italy are excluded

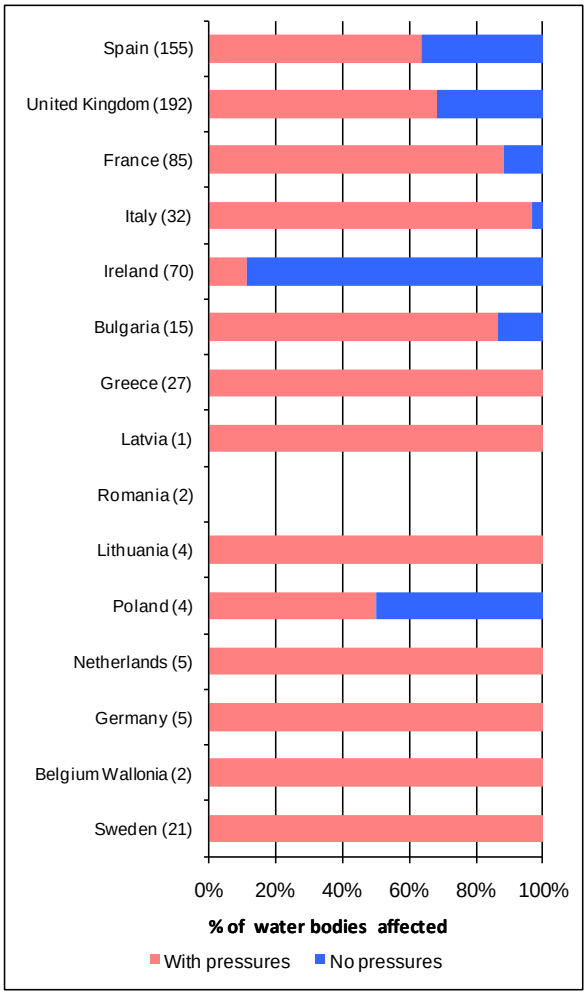
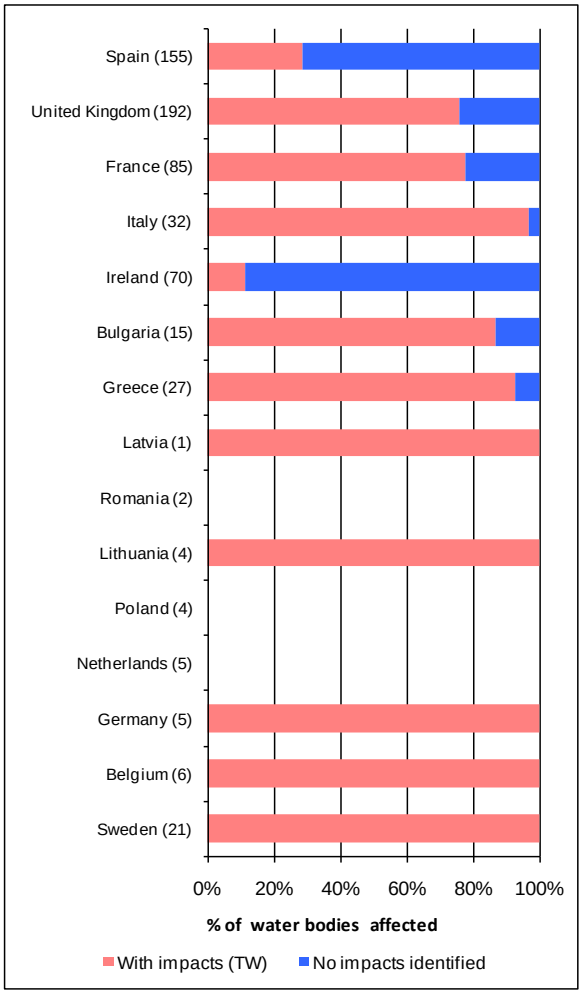
Only classified waters included Sorted by percentage of water bodies in high and good status (by count)	because of erroneous reporting of area Sorted by percentage of water bodies in high and good status (by count)

Figure 11.7.1. Ecological status or potential of classified transitional water bodies in different countries sorted by proportion of good or high ecological status/potential. Left panel: % of total number of coastal water bodies, Right panel: % of total area of coastal water bodies.

Note Ranking of countries with no water bodies in good or better status will be ranked by largest proportion in moderate status followed by poor and bad status.

Pressures and impacts in transitional waters by country

All transitional waters in Greece, Latvia, Lithuania, Netherlands, Germany, Belgium Flanders and Sweden are a subject to significant pressures and similarly also to impacts. Distribution of pressures and impacts mostly corresponds to reported ecological status, except for Ireland and Poland, who have low number of pressures identified, but large percentage of waters in less than good status.

Transitional waters – proportion of water bodies with and without significant pressures	Transitional waters – proportion of water bodies with and without impacts
	

Excel sheet: TCW pressures.xls Notes: based on classified ecological status, pressures for 622 water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count) All Swedish WBs have pressures from diffuse pollution do to mercury	Excel sheet: TCW impacts.xls Notes: based on classified ecological status, impacts were reported for 613 transitional water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania, Poland, Netherlands Only classified waters included Sorted by percentage of water bodies in high and good status (by count) All Swedish WBs have impact from contamination do to mercury

Figure 11.7.2. Left panel: Proportion of total number of classified transitional water bodies reported to be with or without significant pressures, Right panel: Proportion of total number of transitional water bodies reported to be with and without significant impacts.

Individual pressures

All transitional waters in Netherlands, Belgium Flanders, Germany, and Sweden are exposed to significant pressures from diffuse sources. More than 50% of transitional waters are also exposed to diffuse sources in France, Italy and Bulgaria.

Point pressures are less important than diffuse sources. More than 50% of waters is exposed to point pressures in Belgium (Flanders), Poland, Bulgaria and France. Largest percentage (80%) of water bodies exposed to point pressures is in Netherlands.

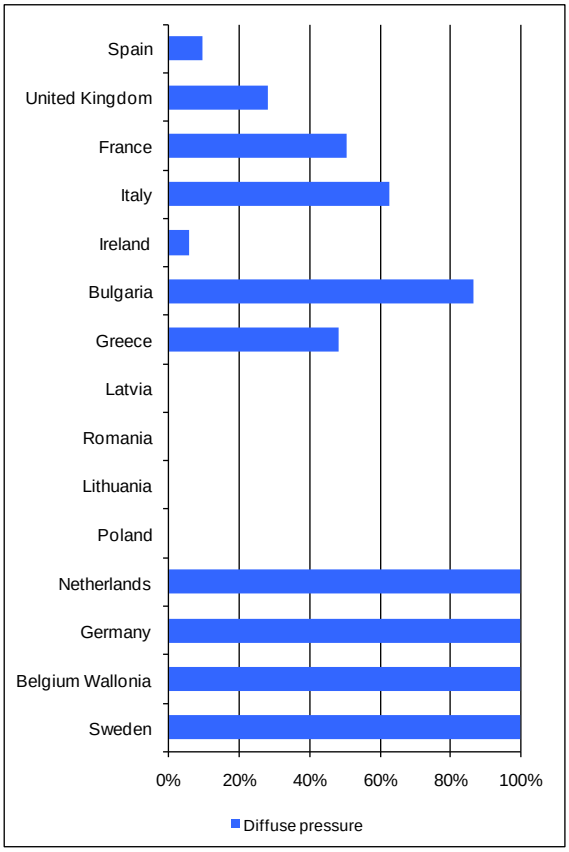
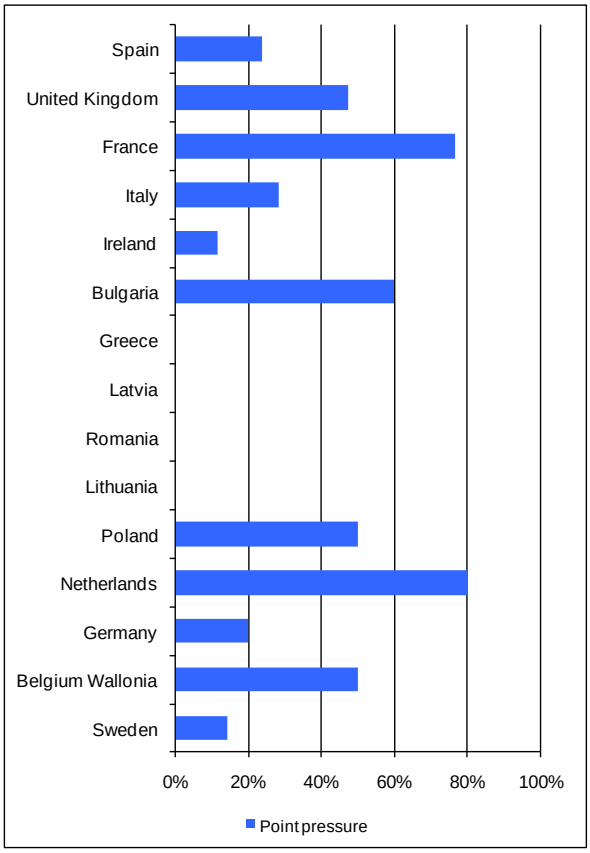
Transitional waters – proportion of water bodies with significant diffuse pressures	Transitional waters – proportion of water bodies with significant point source pressures
	
Excel sheet: TCW pressures.xls Notes: based on classified ecological status, pressures for 622 water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count)	Excel sheet: TCW pressures.xls Notes: based on classified ecological status, pressures for 622 water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count)

Figure 11.7.3. Proportion of total number of classified transitional **water bodies reported to have significant pressures from diffuse sources (left panel) and point sources (right panel). Countries are sorted according to % water bodies in good or better status (see figure 11.7.1)**

Overall, 42% of transitional waters are exposed to significant hydromorphological pressures, TCW management and water abstraction, which is much larger proportion than for coastal waters. Physical alterations are present in all transitional waters in Netherlands, Germany and Belgium Flanders. The proportion of waters with these pressures is between 20-40% also in Greece, Spain, United Kingdom, France, Italy and Ireland.

In addition, 26% of waters are exposed to ‘other significant pressures’

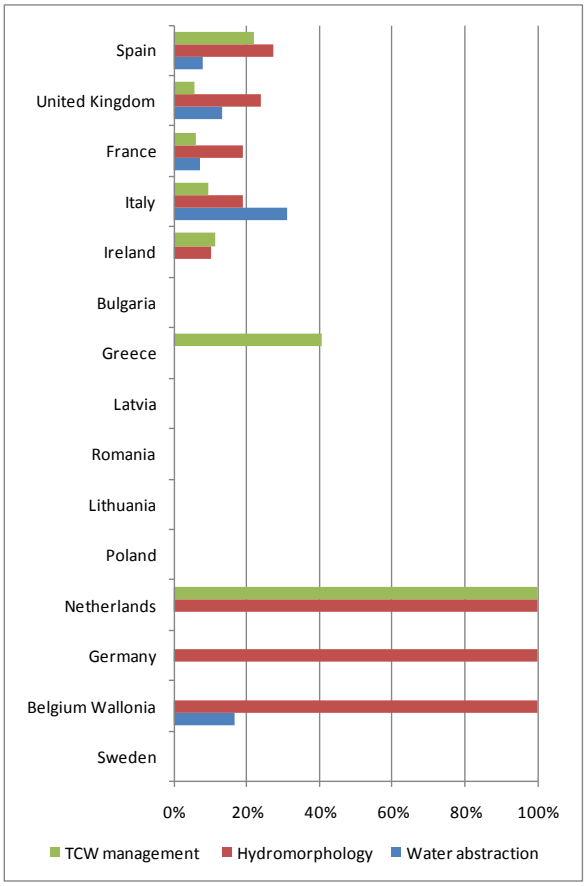
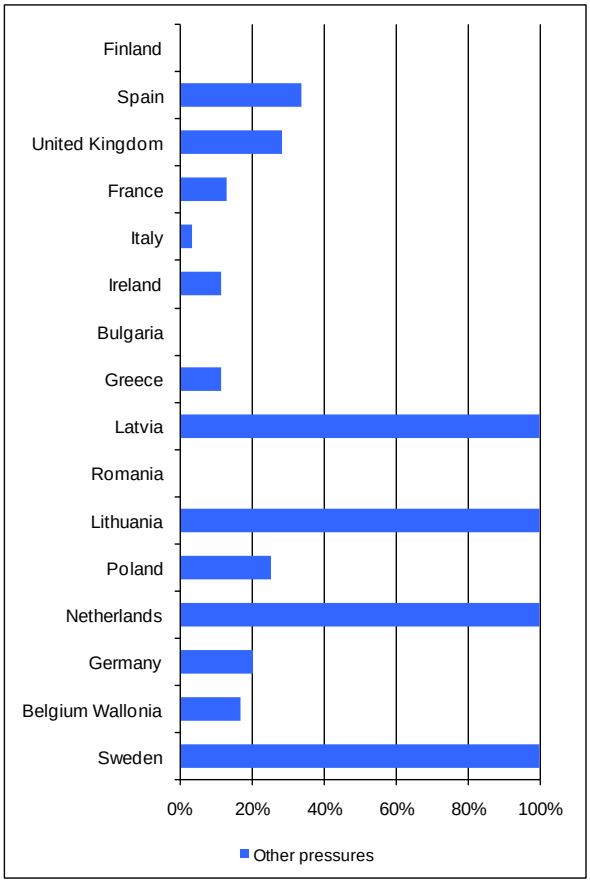
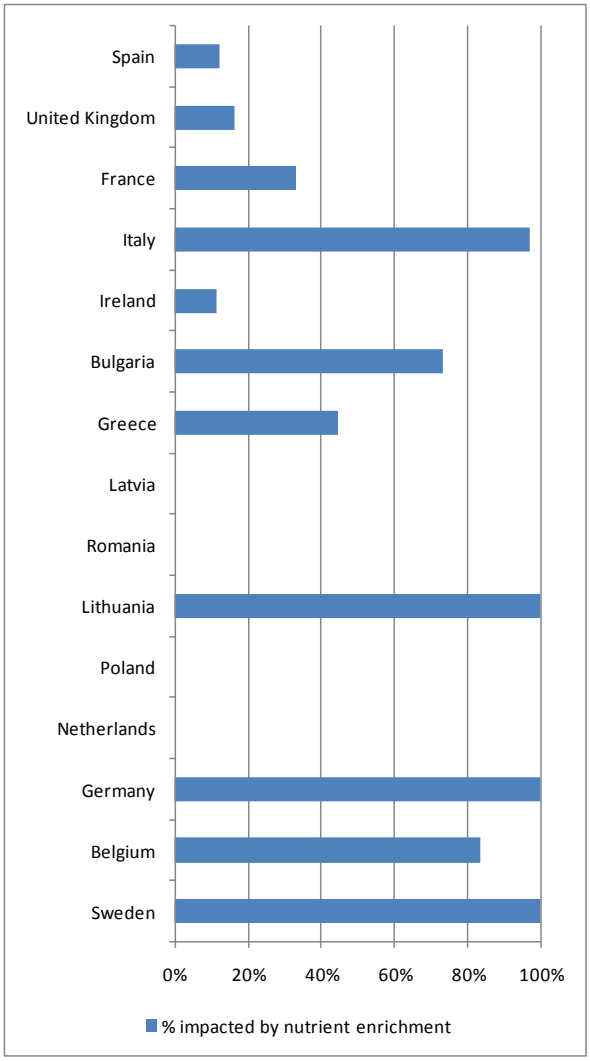
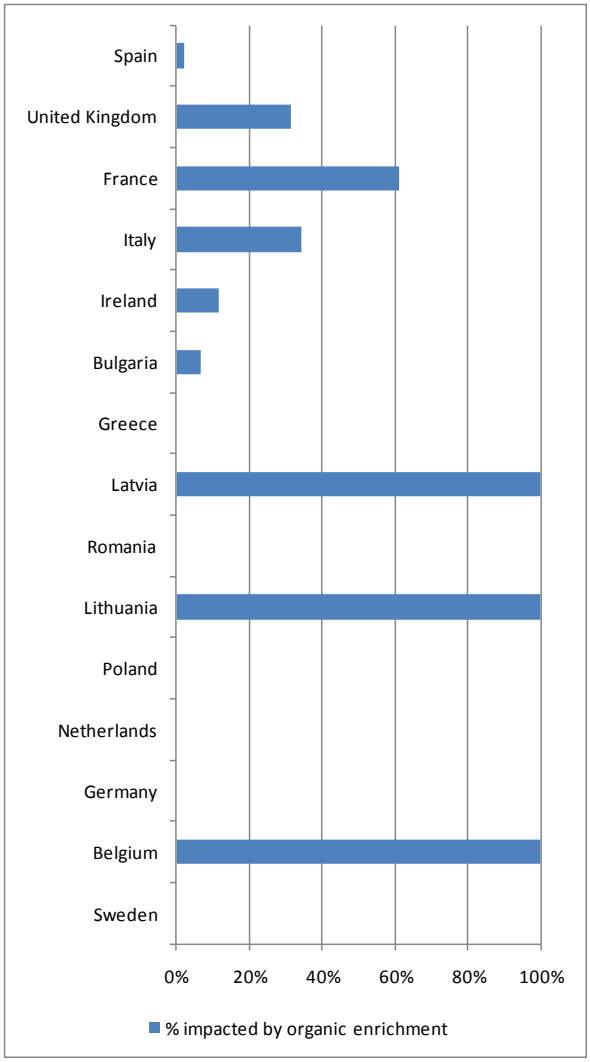
Transitional waters – proportion of water bodies with significant hydromorphological pressures, TCW management and water abstraction	Transitional waters – proportion of water bodies with significant other pressures
	
Excel sheet: TCW pressures.xls Notes: based on classified ecological status, pressures for 622 water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count)	Excel sheet: TCW pressures.xls Notes: based on classified ecological status, pressures for 622 water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count)

Figure 11.7.4. Proportion of total number of classified transitional water bodies reported to have significant pressures from hydromorphological alterations, TCW management and water abstractions (left panel) and other pressures (right panel). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.7.1)

Individual impacts

Overall, significant impacts are reported for 59% of transitional waters.
Nutrient enrichment was reported for 29% of waters and has been detected in all transitional waters in Sweden, Germany, Lithuania as well as in over 80% of waters in Belgium and Italy. Nutrient enrichment was reported also for 10-50% of waters in Spain, United Kingdom, Ireland and Greece.
Organic enrichment was reported for 24% of waters and has been detected in all transitional waters in Belgium, Lithuania and Latvia and in 60% of waters in France. Organic enrichment was reported also for 10-40% of waters in United Kingdom, Italy, Ireland and Bulgaria.

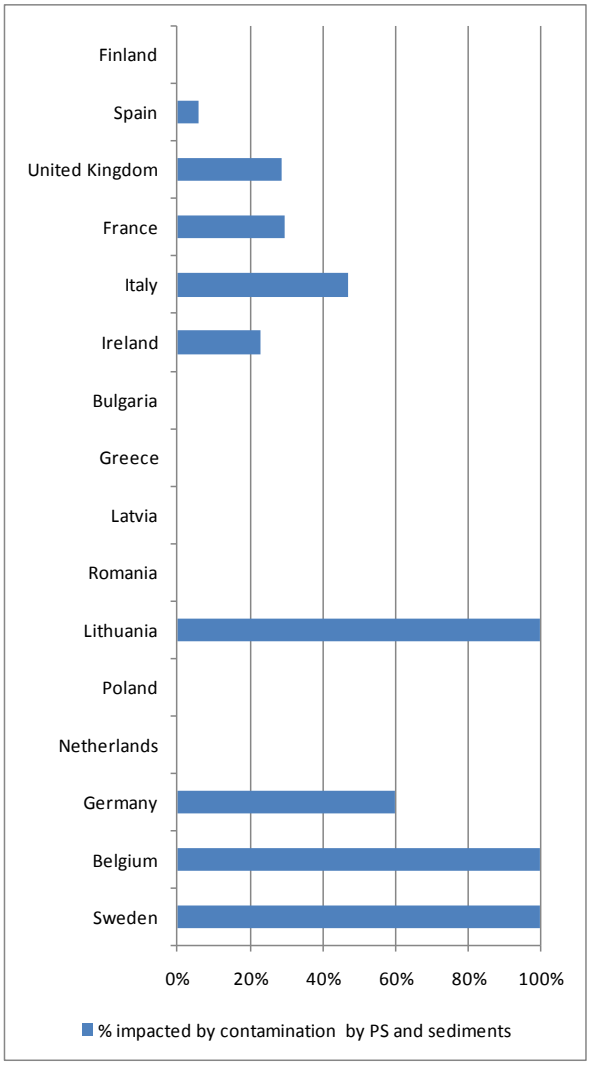
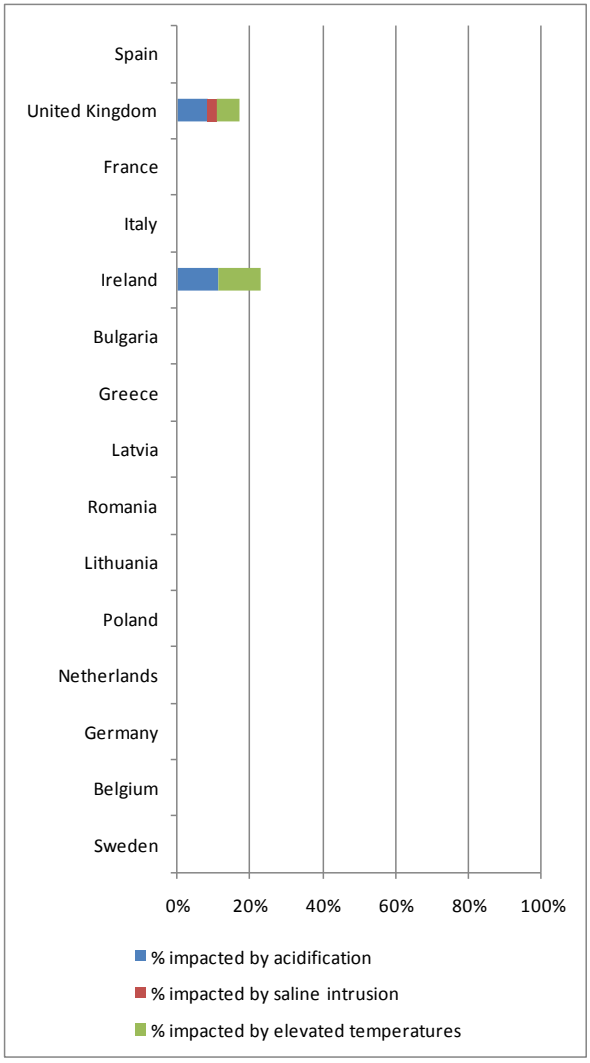
Transitional waters – proportion of water bodies with significant nutrient enrichment	Transitional waters – proportion of water bodies with significant organic enrichment
	
Excel sheet: TCW impacts.xls Notes: based on classified ecological status, impacts were reported for 613 transitional water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status	Excel sheet: TCW impacts.xls Notes: based on classified ecological status, impacts were reported for 613 transitional water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status

(by count)	(by count)

Figure 11.7.5. Proportion of total number of classified transitional water bodies reported to have significant impact from nutrient enrichment (left panel) and organic enrichment (right panel). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.7.1)

Overall, contamination by priority substances and contaminated sediments was reported for 25% of transitional waters. All water bodies are a subject to contamination by priority substances and contaminated sediments in Sweden, Belgium and Lithuania. The proportion is also high in Germany (60%). Contamination is reported in 10-45% also in Spain, United Kingdom, France, Italy and Ireland.

Significant impacts from acidification, saline intrusions and elevated temperature were only reported by United Kingdom and Ireland.

Transitional waters – proportion of water bodies with significant contamination by priority substances and contaminated sediments	Transitional waters – proportion of water bodies with significant impacts from acidification, saline intrusions and elevated temperature
	

Excel sheet: TCW impacts.xls Notes: based on classified ecological status, impacts were reported for 613 transitional water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count)	Excel sheet: TCW impacts.xls Notes: based on classified ecological status, impacts were reported for 613 transitional water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count)

Figure 11.7.6. Proportion of total number of classified transitional water bodies reported to have significant impact from contamination by PS and contaminated sediment (left panel) and acidification (right panel). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.7.1)

Overall, significant altered habitats are reported for 34% of transitional waters.
All German transitional waters are a subject to significantly altered habitats. Altered habitats were reported also for 20-62% of waters in United Kingdom, Italy, Greece and France and 10% in Ireland and Spain.
Other significant impacts are reported for 17% of transitional waters. Largest percentage reported is in Belgium (82%) and in United Kingdom (40%).

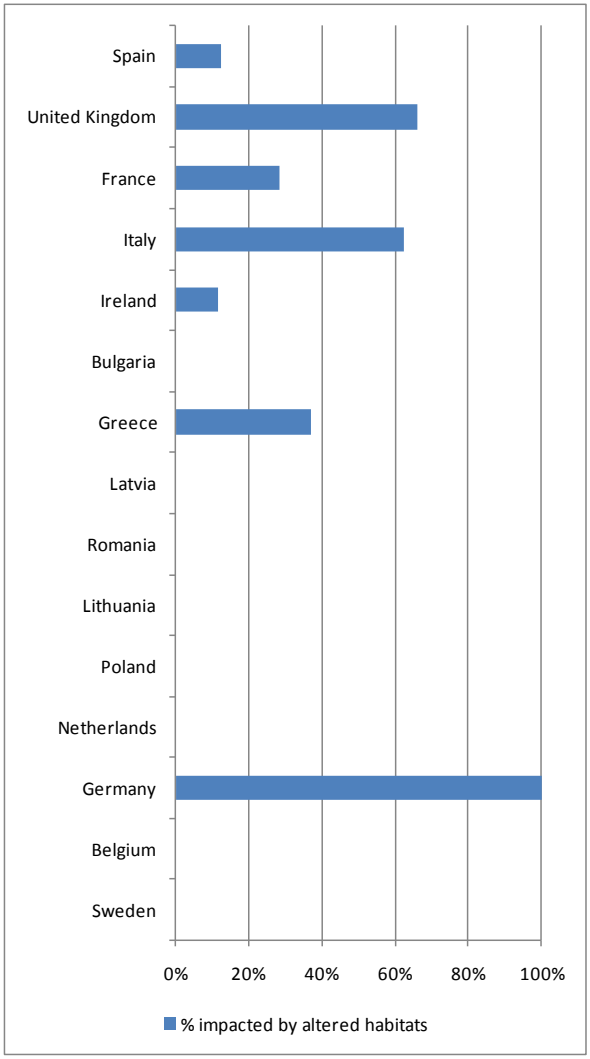
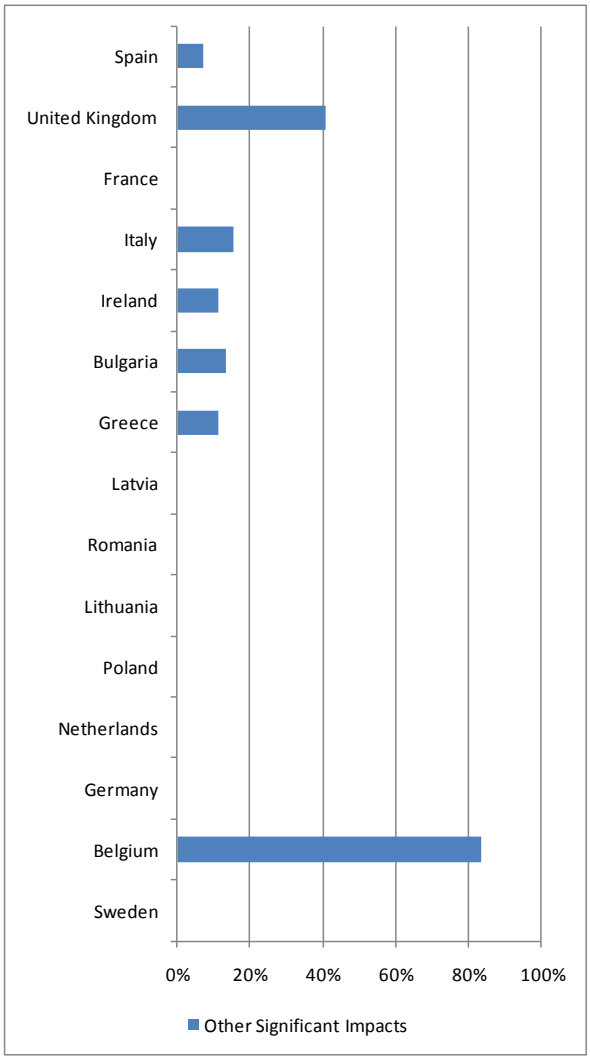
Transitional waters – proportion of water bodies with significantly altered habitats	Transitional waters – proportion of water bodies with significant other impacts
	
Excel sheet: TCW impacts.xls Notes: based on classified ecological status, impacts were reported for 613 transitional water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count)	Excel sheet: TCW impacts.xls Notes: based on classified ecological status, impacts were reported for 613 transitional water bodies was reported from 14 EU member states: Netherlands, Latvia, Poland, Lithuania, Germany, Sweden, Estonia, Bulgaria, Malta, France, Ireland, United Kingdom, Greece, Italy, Spain No pressures were reported for Romania Only classified waters included Sorted by percentage of water bodies in high and good status (by count)

Figure 11.7.7. Proportion of total number of classified transitional water bodies reported to have significantly altered habitats (left panel) and other impacts (right panel). Countries are sorted according to proportion of water bodies in good or better status (see figure 11.5.1)

Transitional waters main assessment, linking ecological status to impacts and pressures

Of all water categories, transitional waters are in worst status relative to the number of water bodies reported, since 68% of transitional waters are in less than good status. There are eight countries where all transitional waters are in less than good status (Sweden, Belgium (Flanders), Germany, Netherlands, Poland, Romania and Latvia). High percentage of water bodies in less than good status is reported also for Greece and Bulgaria (more than 80%). 32% of transitional waters are in high/good status. The highest share of waters in high and good ecological status is found in Spain, United Kingdom, France, Italy and Ireland, but even there only 20-50% of transitional waters are reaching the environmental objective. (Figure 11.7 .1)

Transitional waters are exposed to combinations of different pressures, while 31% of reported transitional water bodies are reported to be without any pressures. All transitional waters in Greece, Latvia, Lithuania, Netherlands, Germany, Belgium Flanders and Sweden are a subject to significant pressures and similarly also to impacts. Distribution of pressures and impacts mostly corresponds to reported ecological status. (Figure 11.7.8)

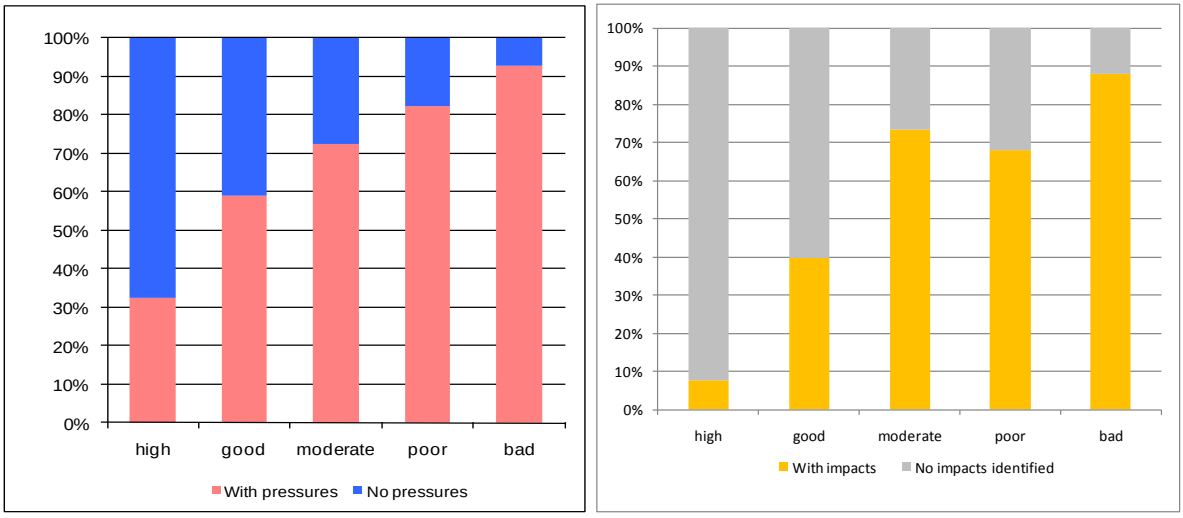


Figure 11.7.8. Ecological status or potential and pressures (left panel) and impacts (right panel) Percentage of water bodies by count

All transitional waters in Netherlands, Belgium Flanders, Germany, and Sweden are exposed to significant pressures from diffuse sources. More than 50% of transitional waters are also exposed to diffuse sources in France, Italy and Bulgaria. Point pressures are less important than diffuse sources. More than 50% of waters is exposed to point pressures in Belgium (Flanders), Poland, Bulgaria and France. Largest percentage (80%) of water bodies exposed to point pressures is in Netherlands. Emissions from point and diffuse sources are causing extensive nutrient enrichment, contamination by priority substances and organic enrichment, which are reported as the most important impacts in transitional waters with less than good.

Overall, 42% of transitional waters are exposed to significant hydromorphological pressures, TCW management and water abstraction, which is much larger proportion than for coastal waters. Physical alterations are present in all transitional waters in Netherlands, Germany and Belgium Flanders. The proportion of waters with these pressures is between 20-40% also in Greece, Spain, United Kingdom, France, Italy and Ireland. Significantly altered habitats are reported for 34% of transitional waters and are a consequence of engineering works, which directly cause removal of habitat or indirectly change the natural conditions. Examples of these pressures are: drainage of land for urban development, agriculture or forestry, port developments or construction of coastal defences to prevent flooding or erosion, removal of material, extraction or placement of sediments. Abstraction of too much water can also be a problem in coastal areas since the river beds can dry up and salt water can be drawn into groundwater. Dams or weirs, which modify or regulate flow regimes, causing also obstacles for fish migration. These alterations lower waters' natural carrying capacity and aggravate impacts of pollution, which may cause bad status of transitional waters if they would be in a natural state.

11.8. Hot-spots

Examples to follow for each water category