

HARBASINS WP1

Document analysis: comparison of WFD Article 5 implementation
in estuaries and coastal zones in Belgium, Denmark, Germany,
the Netherlands and United Kingdom

RWS NOORD NEDERLAND

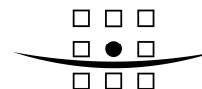
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4. Type and status of the water bodies
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1 INTRODUCTION

1.1 HARBASINS Work package 1

In 2005 the international project HARBASINS was initiated under EU Interreg IIIB funding. The main focus of HARBASINS concerns the harmonisation of management strategies in implementing the EU Water Framework Directive (2000/60/EC, referred to as WFD) with respect to other EU Directives and international agreements, such as:

- The Birds and Habitats directives (BHD).
- Integrated Coastal Zone Management (ICZM).
- The forthcoming European Marine Strategy Directive (EMS).
- OSPAR agreements.
- The Trilateral Wadden Sea Cooperation, in connection with the activities on the management of the coastal area in the Wadden Sea.

EU member states are currently working hard to meet WFD requirements and objectives but there is a concern that obligations and agreements in relation to harmonisation may be forgotten. HARBASINS aims to identify opportunities for harmonisation of national approaches and of the WFD-implementation in coastal areas in relation to the Birds and Habitats directive (BHD) and integrated coastal zone management (ICZM).

This report is part of Work package 1 (WP 1), which is dedicated to harmonisation of management strategies. The other work packages of HARBASINS deal with ecological restoration of estuaries (WP 2), sediment transport (WP 3) and hydromorphological pressures and impacts (WP 4).

1.2 Objectives and focus

HARBASINS WP 1 starts with phase 1: Administrative embedding and legislation. The first phase is subdivided in three project phases:

Phase 1.1: Study of the status of WFD implementation by means of an inventory of available information and document analysis.

Phase 1.2: Analysing the WFD implementation in more detail by executing interviews and organising workshops.

Phase 1.3: Report and recommendations for WP1.

This working document contains the results of phase 1.1. This phase is dedicated to the implementation of WFD requirements in the so called Article 5 reports and how this implementation has considered other EU Directives and international agreements. In order of decreasing attention the relation with other policy fields like Birds and Habitats Directive (Natura 2000) and ICZM are studied. Attention was focused to:

Similarities and differences in WFD implementation that might reveal best-practices and might be beneficial for other member states.

Current practices of member states in accounting for BHD and ICZM aspects during WFD implementation.

Identifying issues that are potentially suitable for harmonisation.

1.3 Scope and limitations

The study area concerns the estuaries and coastal waters in member states which are involved in HARBASINS in the ecoregion North Sea, namely: the Netherlands, Germany, Denmark, Belgium and the United Kingdom. Fresh waters were not considered.

Primarily, this study focuses on the WFD implementation. The BHD directive and the ICZM strategy are only discussed briefly. The EMS directive which is in preparation could not be taken into account yet. National legislation is not considered. Status is described in the report on administrative embedding. Annex 6 gives an overview of the National legislation regarding the WFD.

This document analysis is based on published Article 5 reports only. It provides a snapshot in time and does not reflect of today's current state.

The economic analyses in the Article 5 reports were not considered, because of the early stage in the process.

1.4 Activities

Three activities were conducted in this study:

a) short list of available information

The first step in the process was to determine what information is available for the member states considered. This was documented in a checklist which enabled countries to be compared easily.

b) document analysis

All available WFD Article 5 reports from the relevant river basins (bordering the North Sea) in Netherlands, Germany, Belgium, United Kingdom and Denmark were collected and studied. For each country a description as been made of the Article 5 reports: typology, delimitation of water bodies, assignment of status and risk assessment. The Article 5 reports were screened by means of a checklist in order to identify differences and similarities between the countries. This was useful in providing an overview of the approaches. Deviations from WFD requirements and international guidances were noted.

The member states reports for the implementation of ICZM were then screened for the sustainability indicators and progress indicators. The indicators were examined in their relation with WFD and Natura 2000 (BHD). Results from the document analysis were reported according to an agreed format for every country. All relevant documents that have been screened are listed in appendix 1.

c) Conclusions and recommendations

The last activity concerned the analysis of similarities and differences between member states. This is important in understanding why countries have taken different approaches and it might reveal issues for harmonisation for the implementation of the WFD in relation to Natura 2000 and ICZM. Aspects that are potentially useful in considering harmonisation were noted.

1.5 Status of this document

This report is to be considered a working document for the Harbasins Work Package 1. It is aimed to the group of members of the HARBASINS project team. The results provide input for the next phases: the interviews with key persons and workshops.

2 CONTENTS OF THE RIVER BASIN CHARACTERISATION REPORTS

2.1 Introduction

According to Article 5 of the WFD member states should characterise all waters within their territory. WFD annex 2 provides requirements and details how to do this. Further more this activity is supported by a number of international CIS guidance's (Common Implementation Strategy), like the Guidance on reference conditions and the Guidance Document in identification and designation of heavily modified and artificial water bodies [lit. 30].

The so-called article 5 reports are based on the WFD requirements for the initial characterisation of river basins. This study focuses on five elements:

- Delimitation of surface water bodies (identification of location and boundaries).
- Typology of transitional and coastal waters.
- Assignment of status of water bodies.
- Reference conditions of natural water types.
- Risk assessment.

2.2 Identification of water bodies: setting the borders

Member states have to identify surface water bodies and define the boundaries geographically. There are four categories of natural surface water bodies to choose from: rivers, lakes, transitional waters or coastal waters. This report only considers transitional and coastal water bodies.

The surface water bodies can be designated as natural waters, artificial waters or heavily modified water bodies.

2.3 Typology

Within each category of water bodies member states can identify water body types that vary in ecological relevant features or environmental conditions. In establishing a typology member states may choose between systems A or B. System A is a method for developing a typology based on a set of fixed criteria or descriptors. System B offers more possibilities for differentiation because optional criteria are allowed next to a set of obligatory descriptors. Combinations of these descriptors can also be used.

2.4 Assignment of status

In the Article 5 reports member states have to provide a provisional assignment of the status of all water bodies. If a water body is 'at risk' in failing to achieve *Good Ecological Status* in 2015 and this is due to significant hydromorphological human pressures, the status heavily modified water body can be assigned [lit. 31].

A water body created by human activity is an artificial water body. For artificial and heavily modified surface water bodies, the assignment implies different ecological objectives. The objective then is *Good Ecological Potential* rather than *Good Ecological Status*, to be achieved in 2015.

Water bodies that are not artificial or heavily modified are referred to as natural.

This reports looks into differences and similarities in the assignment of status between member states in order to investigate possibilities for harmonisation.

2.5 Reference conditions

Reference conditions (equivalent to *High Ecological*) will be set in relation to the ecology expected to be found in each water type and represent undisturbed or nearly undisturbed conditions. These provide the reference point for the quality status assessment and classification scheme.

Following characterisation of surface water bodies into different water body types, type-specific biological, hydromorphological and physicochemical conditions have to be defined and described. These descriptors represent the values of the biological, hydromorphological and physicochemical quality elements specified in Annex V of the WFD for that surface water body type that describe High Ecological Status as defined in point 1.2 in Annex V of the WFD. In this report these quality elements used by the different countries are compared.

Table 2.1 Descriptors required in the WFD to describe the conditions of transitional waters (annex 5, 1.1.3 of the WFD) and the coastal waters (annex 5, 1.1.4 of the WFD)

Quality elements	Descriptors WFD	Transitional waters	Coastal waters
Biological	Composition, abundance and biomass of phytoplankton	X	X
	Composition and abundance of other aquatic flora	X	X
	Composition and abundance of benthic invertebrate fauna	X	X
	Composition and abundance of fish fauna	X	
Hydromorphological	Morphological		
	Depth variation	X	X
	Quantity structure and substrate	X	
	Structure and substrate of the coastal bed	X	X
	Structure of the intertidal zone	X	X
	Tidal regime		
	Fresh water flow	X	
	Wave exposure	X	X
	Direction of dominant currents		X

Quality elements	Descriptors WFD	Transitional waters	Coastal waters
Physico-Chemical	General		
	Transparency	X	X
	Thermal conditions	X	X
	Oxygenation conditions	X	X
	Salinity	X	X
	Nutrient conditions	X	X
	Specific Pollutants		
	Pollution by all priority substances emitted into the water body	X	X
	Pollution by all substances emitted in significant amounts into the water body	X	X

2.6 Risk assessment

One of the main objectives of WFD is to achieve the Good Ecological and Good Chemical Status for all water bodies in river basins by 2015. In the article 5 report a first assessment has to be made of the risk of failing to achieve this objective. In the first river basin management plan, which has to be completed in 2009, a more definitive assessment has to be delivered. Member states have to collect and maintain information on the type and magnitude of the significant anthropogenic pressures in the surface water bodies in each river basin district. In this report the main pressures and basic information for the risk assessment in rivers basins described in the Article 5 reports and the method of how this was done are compared for the different participating countries.

3 BELGIUM

The characterisation report for Flanders [lit. 4] is a comprehensive report, including all details of the reference conditions and typology. In a separate document, a coordinating report for the international Scheldt river basin on the characterisation was published, including the Dutch and French parts of the basin. The French parts are not part of the North Sea ecoregion. The Dutch part is discussed in chapter 6. This international approach contributes to the harmonisation between the Dutch and Belgian methods. Coastal waters are within the competence of federal authority of Belgium and thus not reported in the Flanders report. *From the interviews later on it was learned that a separate Article 5 report was drafted for North Sae coast.*

3.1 Transitional Waters

The only Belgian river basin with a large estuary in the North Sea is the Scheldt.

3.1.1 Identification of water bodies

In the *Scheldt* river basin district, seven transitional waters have the status heavily modified waterbodies because of the high morphological changes (due to f.e. deepening for shipping) which have taken place in all transitional water bodies. The three ports (Oostende, Blankenberge and Brugge) and the surrounding shipping routes have the status artificial waterbodies. The IJzer is a separate waterbody and has the status heavily modified. An overview of the Belgium waterbodies, the type and their status can be found in annex 2 and 4.

Salinity gradient and tidal influence are used as descriptors for identifying boundaries of the transitional waters towards the coast in Flanders.

Harbours and shipping routes

In the Scheldt river basin district three harbours (Oostende, Blankenberge and Zeebrugge) including the shipping routes to the harbours are separately identified as artificial water bodies.

3.1.2 Typology

In Belgium system B is used to distinguish types for transitional waters. The typology of the Belgium water bodies is described in the river basins district Scheldt art. 5 report [lit. 4]. The Belgian typology uses all obligatory descriptors (latitude, longitude, tidal range, and salinity). Optional factors like residence time, mixing characteristics and intertidal surface are also applied.

There are two types of transitional waters in the river basin district of the Scheldt. The first is type O1: a macrotidal lowland estuary and the second type O2: a mesotidal lowland estuary. The Sea Scheldt has type O1; the IJzer and three harbours have type O2. A further explanation on the typology can be found in the SDG Scheldt art. 5 report [lit. 4].

3.1.3 Reference conditions

In Belgium, the EU guidelines [lit. 6 en lit. 7] are followed to describe the reference conditions for the different types of transitional waters. Biological, hydromorphological, physico-chemical and chemical descriptors are used.

The descriptors used comply with the required WFD descriptors for reference conditions with one exception. For hydromorphological descriptors the meandering pattern and bank structure are used.

All transitional waters in Belgium have been identified as heavily modified water bodies, therefore are the maximal and good ecological potential (MEP/GEP) used as reference conditions and environmental objective respectively. The MEP and GEP are described in Brys et al., 2005). [lit 9]

The setup for a biological reference condition for the Flemish part of Belgium's transitional waters is based on phytoplankton, chlorophyll-a, nutrients and light conditions. Because of the mortality zone in brackish waters, there is no metric for phytoplankton for the brackish parts of the transitional waters [lit. 4]. This is due to the complexity of the areas. The setup of a historical reference and an environmental reference was difficult due to high morphological changes caused by human interference. Therefore the maximum score for each variable or metric has been used as reference condition.

An overview of the used descriptors for the reference conditions and the used data to measure these descriptors are given in annex 4 and 5 respectively.

At the time the characterisation report was written the hydromorphological quality elements for linear watercourses were not yet selected. For the benthic structure the presence of marshes and mudflats were selected as a metric. Another problem has occurred in determining the physicochemical reference condition. At this moment there are no data available to appoint the optimal nutrient composition for transitional waters.

3.1.4 Risk assessment

The risk assessment in Belgium for 2015 is based on the PEGASE model, with the exception for the water body the IJzer. This is done using the SIMCAT model. These models give an indication of the status of all water bodies in Belgium, based on present water quality data and future policy measures.

The policy measures are combined in the Business As Usual scenario (BAU-scenario). This is based on all the future measures of policies. In the BAU-scenario the status 'at risk' or 'not at risk' is determined by the following descriptors: physicochemical, organic substances, nitrogen, nitrate and phosphorous. For Belgium (Flanders) there is no overview map to show where all descriptors are combined to show the risk status. A general conclusion is that most of the transitional waters are at risk because these fail to meet the WFD objectives for one of the descriptors used by the BAU-scenario [lit. 4].

Main pressures transitional waters

The main pressures in the transitional and coastal waters are: households, industry and agriculture. In general the status of the water quality in Flanders for 2000 is poor. Households, agriculture (nitrate) and hydromorphological changes are thought to have the greatest impact on the water quality, however for nitrate; agriculture is expected to

be the main contributing factor. Industry is thought to be responsible for the problems associated with chemical oxygen demand.

3.1.5 Assignment of status

The status of the waterbodies is already described in 3.1.1.

3.2 Coastal waters

3.2.1 Identification and status of water bodies

In total Belgium has two coastal waterbodies. In the Scheldt river basin district there is one water body assigned as coastal water: 'Het Zwin'. The boundary on the sea side corresponds with the tidal inlet in the dune line at the coastal side. The boundary towards the main land is formed by the high water level line, which is the same as the border of the national park 'Het Zwin'.

The coastal waters in Belgium are within authority of the federal government. A separate Article 5 report was written for these coastal waters. The whole of the coastal zone has been assigned as one coastal water body by the federal government.

3.2.2 Typology

In Belgium system B is used to divide transitional and coastal waters into types. The typology of the Belgium water bodies is described in SDG Scheldt art. 5 report [lit. 4]. The obligatory factors and optional factors used to describe the typology are consistent with those in the EU guidelines. For coastal waters in Belgium all obligatory factors are used and eight optional descriptors: wave exposure, current velocity, average temperature, mixing characteristics, turbidity, residence time, composition of the substrate and temperature reach, are used.

These results in one coastal water body type K1: a mesotidal tidal inlet or sea arm. A further explanation on the typology can be found in the SDG Scheldt art. 5 report [lit. 4]. The typology of the coastal water body is not known yet.

3.2.3 Reference conditions

In Belgium the CIS guidelines [lit. 32] are followed to describe the reference conditions for the different types of coastal waters. Biological, hydromorphological and chemical/physiochemical parameters are used to describe the reference conditions for coastal waters according to the WFD. The same descriptors are used for the reference conditions for Belgium coastal waters as for the transitional waters and those described in the SDG Scheldt Article 5 report for typology [lit. 4].

The Article 5 report about the North Sea coastal water from the federal government the reference conditions are not yet described.

From the required physiochemical descriptors for coastal waters only salinity is used. From the required biological descriptors for coastal waters angiosperms is used instead of other aquatic flora and benthic invertebrate fauna.

The coastal waters are compared to similar standards as those applied to the transitional waters to determine the chemical and ecological status of water bodies.

An overview of these descriptors and their parameters can be found in annex 4 and 5 respectively.

3.2.4 Risk assessment

The risk assessment of 'Het Zwin' revealed that the water body is at risk. The method used can be found in 6.1.5.

For the other coastal water body a risk assessment has not yet been executed.

Main pressures coastal waters

The main pressures in coastal waters of the Scheldt river basin district are: households, industry and agriculture.

4 DENMARK

The Report of the Article 5 of the WFD is not available in English. Therefore we made a short summary of the available information.

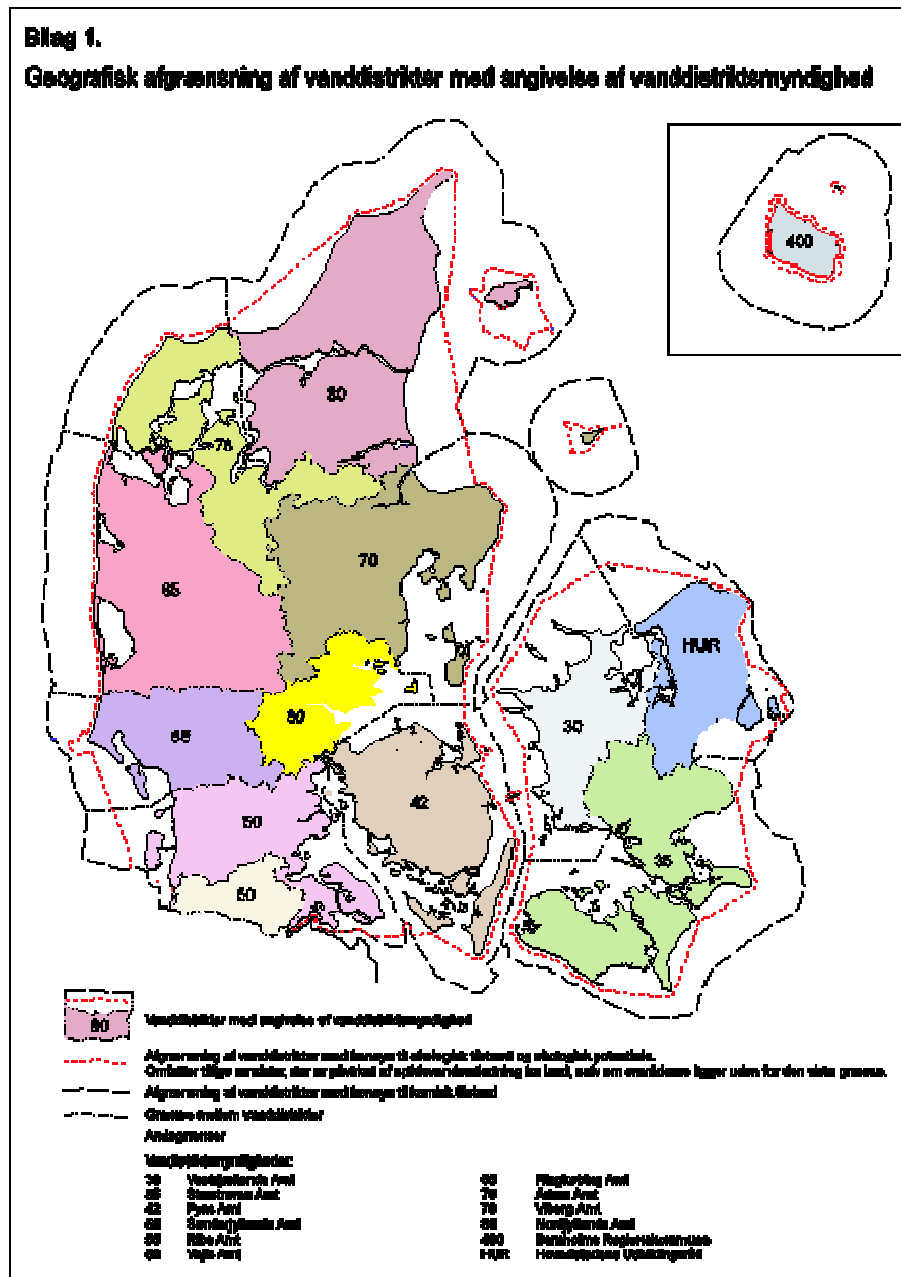
Denmark is divided into 13 water districts and administrated by their own 'Amt' (see fig. 1.1). In the Final Report to the Commission (Lit. 24 a) these districts are mentioned, but the results are published in two separate reports per water district. In the first report a general description of the water district, a characterization of the water and the impact of the human activity is described. In the second report a risk assessment per water district is published. The water districts use a different approach and not all PDF files could be downloaded from the internet. Therefore we contacted Mr. Jensen at the Danish Environmental Protection Agency and received further information.

Denmark exists of a great number of islands and the amount of coastline, estuaries and fjords is numerous. Denmark did not identify transitional waters, but focused on coastal areas ('kystvand'). The marine parts concern 1 mile from the coast and for the chemical status until 12 mile. There has been a lot of co-operation between the different water districts and one amt has had the responsibility for a river basin that runs through several amt : Arhus, Vejle and Viborg have worked together and the 4 water districts along the Limfjorden have made an own Article 5 analysis (water districts 65, 70, 76, 80, see fig. 1.1). From the 1st of January 2007 reorganization has taken place and there will be only 4 river basin districts.

4.1 Transitional waters

Transitional waters were not considered in Denmark since the coastline exists mainly of fjords. These fjords were subdivided in different parts during characterization (see coastal waters).

Figure 4.1 Geographical delineation of river basin districts in Denmark



4.2 Coastal waters

4.2.1 Identification of the waterbodies

Each water district has identified waterbodies based on salinity, wave exposure and mean tidal range. For example, the water district of Fyn has 37 waterbodies and the water district Nordjylland has five waterbodies. The harbours are included in the waterbodies. The large shipping routes are situated outside the borders from the Water Framework Directive and therefore not treated separately.

4.2.2 Typology

In Denmark the system B (physical and chemical factors) is used to divide coastal waters into different types (lit. 24b). The obligatory factors were used: latitude, longitude, tidal range and salinity.

The coastal waters are divided into two types: fjords and open coastal stretches that are areas which are not fjords. The open coastal are similar to the common typology agreed by member states. The fjords are on their turn differentiated further into different types according to salinity, stratification and an index associated with water retention time and fresh water run off (10 types). In total 15 types were identified (see table 1.2.1 and 1.2.2 and fig. 2)

Table 4.2.1 Different types of open coastal stretches

Surrounding	Type
West coast Jylland	OW4
Wadden Sea (Vadehavet)	OW5
Deeper parts of Kattegat north of Sjælland	OW1
Kattegat and northern Belt Sea, Little Belt bridge and north of Drogden	OW2
Southern part of Belt sea and Western Baltic Sea, Little Belt bridge and south of Drogden	OW3a
Western Baltic Sea, Coast of Åbne, Bornholm	OW3b

Table 4.2.2 Different types of fjords

Surrounding	Type
Inner Randers fjord	O3
Augustenborg fjord, Helnæs bugt, Nakskov fjord, Inner Åbenrå fjord, Inner Mariager fjord	M1
Roskilde fjord, Dybsø fjord, Præstø fjord, Holsteinsborg nor, Lunkebugten	M2
Karrebæk fjord, Central Randers fjord, Holckenhavn fjord	M3
Indre Odense fjord	M4
Flensborg fjord, Gamborg fjord, Outer Åbenrå fjord, Outer Mariager fjord	P1
Isefjord	P2
Århus bugt, Horsens fjord, Vejle fjord, Kalundborg fjord, Kolding fjord, Skive fjord, Lovns bredning, Risgårde bredning, Outer Randers fjord	P3
Nissum bredning	P4
Thisted bredning, Kås bredning, Løgstør bredning, Nibe bredning,	
Ringkjøbing fjord, Nissum Fjord	Slusefjorde

4.2.3 Reference conditions

The reference conditions are not yet fixed and the description is still in process. Once the intercalibration process is finished there will be a good definition of the reference conditions. Until then the reference conditions of an existing planning system is used (Miljømålsloven).

4.2.4 Risk assessment

The risk assessment is carried out by a projection loads and pressures till 2015. Several counties were able to make detailed calculations for specific coastal waters, in particular for fjords, and some counties the assessment was possible based on operational criteria for environmental objectives.

The risk assessment shows that more than 90% of Danish coastal waters are at risk of not achieving good status in 2015. The most widespread reason is nutrient pressure mainly due to run off from agricultural areas. In over half of the coastal waters the risk is further more combined with pressure from dangerous substances to a large extent due to pressure with TBT from shipping. Finally nearly half of the coastal waters are in risk of not achieving good status due to direct pressure on biological conditions eg. from bottom trawling fishing gear.

In summary the Danish Ministry of the Environment finds the risk assessments are prepared on a conservative basis that has led to an overestimation of water bodies at risk as regards eutrophication, in particular, for coastal areas bordering open marine waters

The risk assessment is divided in two categories:

- I. Waterbodies where the objectives for water quality can be reached by 22 December 2015.
- II. Waterbodies where there is a risk that the objectives for water quality can not be reached by 22 December 2015.

These categories are in their turn divided in two categories:

- Ia** It is certain that the regional targets will be reached.
- Ib** The current data indicate that there is no risk to not reach the targets, but the quality and the use of data can be prepared.
- IIa** It is possible that the targets are not reached, but more data is needed to be certain about it.
- IIb** It is very probable that the targets are not reached and more characterization and consideration is needed.
- IIc** It is sure that without further characterization and consideration the targets will not be reached.

Table 4.2.4 Surface areas of pressures in river basins in different risk categories

Total areal ha:	2.610.436	B	FM	KH	MFS	N	U
Kategori I	la	548.191	37.761	100.460	355	82.613	0
	lb	16.260	800	0	16.260	0	0
	Total	564.451	38.561	100.460	16.615	82.613	0
Kategori II	IIa	194.286	675	38.166	826.883	510.429	0
	IIb	1.234.430	80.481	9.899	813.583	1.754.327	0
	IIc	111.490	97.650	1.721	63.592	263.067	0
	Total	1.540.206	178.806	49.786	1.704.058	2.527.823	0

Symbols of the influence types:

- B: Biological conditions – direct influence on flora and fauna
 FM: Hydromorphological conditions – physical (morphological) changes
 KH: Quantitative hydrological changes
 MFS: Dangerous substances – physical and chemical conditions
 N: Nutrients
 U: Without influence of human activities

For example, in almost areas of the water district Fyn the coastal water bodies are at risk to achieve the WFD objectives by 2015 because of the high quantities of environmentally dangerous substances (TBT, Cu, Cd, Hg, PAH) and nutrients. None of the coastal areas are natural. In Øresund and Køge bight there are expectations to reach the WFD obligations concerning nutrients. In Vestsjællands district are all, but one part is at risk to achieve the WFD obligations by 2015 Nutrients and environmentally dangerous substances.

In Nordjylland the targets can partly be reached until 2015. In Århus are all parts at risk.

4.2.5 Assignment of status

The majority of the coastal waters are assigned the natural status, but they are affected by eutrophication so they can not reach the good biological status. In the fjords where the main harbours are situated the status is heavily modified (Slusefjords). In cases like dredged canals the influence is limited to the surrounding areas and therefore the status is not heavily modified.

Harbours are included in the coastal areas and they are only a small area compared to the total coastal area. The major shipping routes are situated outside the WFD area and not considered here.

5 GERMANY

5.1 Transitional Waters

In Germany the rivers Ems, Weser, Elbe and Eider have large estuaries in the Wadden Sea. The Ems River basin district covers:

1. The Ems estuary; this part of the district will be described in chapter 6.
2. The coastal waters of the East Frisian coast (from Borkum to Spiekeroog) 'Untere Ems'; this part of the district will be described in this chapter.

5.1.1 Identification of water bodies

All transitional water bodies in the river basins of the Weser, Eider, Ems and Elbe are situated in the ecoregion 'North Sea'.

The following criteria were used to identify water bodies:

- change of water type;
- change of status (natural, artificial or heavily modified);
- clear change of pressures or risk assessment.

In the document 'Water Framework Directive Weser' harbours are classified as artificial surface water bodies. Because of their small size, they are added to the nearest water body as artificial water element. In the documents 'Water Framework Directive Eider, Ems and Elbe' harbours are not separately mentioned, but part of the transitional water bodies [lit. 15,16, 17 en 18]. An overview of the water bodies can be found in annex 4.

5.1.2 Typology

Germany has chosen system B to establish the typology. The '*Flussgebietsgemeinschaften*' Ems, Weser, Elbe and Eider have applied the same methodology. All obligatory factors are used. Depth (Weser and Ems), mean substratum composition (Ems, Weser and Elbe) and current velocity, mixing, residence time, wave exposure and tidal reach (Ems) are the optional factors used. Germany has only one type of transitional water.

In the river basin Eider, only the part of the river has been marked as transitional water body where a tidal effect can be measured. In the river basin Elbe and the river basin part 'Untere Ems' the border between the transitional water body and the river water body, is the 'line' between salt and fresh water. The difference in approach of the different estuaries is due to the political boundaries of the different German 'Bundesländer' that are in charge.

5.1.3 Reference conditions

The description for the reference for transitional waters is still under development (2005). In Germany, the description of reference conditions is compliant with WFD requirements: biological, hydromorphological and chemical parameters are used [lit. 6]. For every surface water body type, an undisturbed water body condition has been identified. The Highest Ecological Potential for heavily modified water bodies are also described for each individual water body. Parameters for undisturbed water bodies are

for example: 'zero' background concentrations of pollutants, no major morphological (anthropogenic) changes and nutrient, organic and acid conditions and salinity. If undisturbed water bodies are not available for a certain typology, historical information, expert judgement or models are used to determine the reference condition.

From the in the WFD required biological descriptors for transitional waters only phytoplankton is not used. All the other required descriptors are used. An overview of these descriptors and parameters and the can be found in annex 2 and 5 respectively.

5.1.4 Risk assessment

In the transitional waters of the '*Flussgebietsgemeinschaften* Weser, Eider and Elbe' the main pressures that prevent the water bodies reaching the environmental objectives are: point and diffuse sources of pollutants, permanent morphological changes, cooling water discharges, harbours, shipping and polluted sediment. For all the transitional water bodies objectives are expected not be achieved by 2015 and so these are all at risk. The described reasons are:

the chemical situation for the Weser;
high content of suspended solids
the morphological changes for Eider and Elbe are not reversible.

5.1.5 Assignment of status

All transitional water bodies are assigned the status of heavily modified. Fixed morphological conditions due to maintenance dredging measures for shipping (among other things) are the main reason. In the '*Flussgebietsgemeinschaft* Weser' surface water bodies near the harbours are assigned artificial water elements.

5.2 Coastal waters

5.2.1 Identification of water bodies

The Eider has ten coastal water bodies, the Weser four, the 'Untere Ems' has three coastal water bodies and the Elbe also four water bodies. A change of water body is based on differences in type (physico-chemical differences as salinity, amount of openness).

5.2.2 Typology

Germany has chosen system B for typology. The '*Flussgebietsgemeinschaften*' Weser, Eider, Ems and Elbe applied the same methodology. All obligatory factors are used. Depth (Weser and Ems), mean substratum composition (Weser, Ems, Eider and Elbe) and wave exposure (Eider, Ems and Elbe) are the used optional factors. There are therefore differences between optional factors used for the typology of Eider and Elbe and the Weser river basin districts.

Germany has five types of coastal water (N1-N5). N1 and N2 are euhaline coastal waters, N3 is a polyhaline open coastal water, N4 is a polyhaline coastal water and N5 is euhaline with rock character (specific for Helgoland).

The water body 'Lister Tief' crosses the borders of Germany (typology N2) and Denmark (Typology OW5). Both typologies describe an euhaline coastal water.

5.2.3 Reference conditions

In Germany the description of reference conditions for coastal waters is performed in the same way as that for transitional waters (see paragraph 6.3.1). The reference conditions for German coastal waters are based on expert judgement due to the lack of historical data.

All the in the WFD required descriptors for coastal waters are used. An overview of these descriptors and the used parameters can be found in annex 4 and 5 respectively.

5.2.4 Risk assessment

In the coastal waters of the '*Flussgebietsgemeinschaften* Weser, Ems, Eider and Elbe' the main pressures that prevent from reaching the Directive's environmental objectives are: point and diffuse sources of pollutants, permanent morphological changes, cooling water discharges, harbours, shipping and polluted sediment. For all coastal water bodies it is expected to be difficult to reach the objectives: these are at risk. The described reasons are:

Weser: the main pressures are 1) change in settlement of fauna and flora, 2) load of pollutants (for example heavy metals and nitrate and phosphate).

Eider: Without additional measures it is not possible for the coastal water bodies to reach the objectives. These measures will have to reduce the pollution of nutrients (point and diffuse sources).

Elbe: For all water bodies it is impossible to reach the objectives. The main reasons are the load of pollutants (for example heavy metals and nitrate and phosphate) from Elbe and adjacent coastal water bodies.

Ems: the main problem is eutrophication, which leads to algal blooms and loss of transparency.

5.2.5 Assignment of status

All the coastal water bodies have the status of natural water bodies.

For the status assignment of harbours and shipping routes the following conclusions can be drawn based on the Article 5 reports produced by Germany [lit. 14, 15 en 16]:

Harbours:

Weser: harbours are heavily modified: The morphological conditions along the shipping routes are fixed due to the maintenance dredging measures required for shipping. However, although the natural processes of sedimentation and erosion dominate the coast around shipping routes they are small compared to the whole surface of the coastal water body. Therefore the anthropogenic changes have no significant effect on the ecological conditions of the coastal water bodies. At the moment (2005) a study is being undertaken to distinguish the shipping routes as separate water bodies. Water surfaces in the neighbourhood of harbours are assigned artificial water elements.

Eider and Elbe: natural: The coastal water bodies are not hydromorphologically and structurally changed in such a way that they can be assigned as heavily modified.

For example: the shipping routes have no significant effect on the living communities in the water body.

Ems: the data are not sufficient at the moment to signify if a harbour is heavily modified or artificial.

Shipping routes

Weser: An exact definition of the borders of the shipping routes is not possible according to the available information (2005). At the moment (2005) a study is being undertaken to distinguish the shipping routes as independent water bodies.

Eider and Elbe: Shipping routes are not mentioned in the document.

Ems; the data are not sufficient at the moment to distinguish the shipping routes as either heavily modified or artificial.

6 THE NETHERLANDS

The information used in this chapter in addition to the four characterisation reports [lit. 9, 10, 11 en 12] includes several back-ground reports [lit. 1, 2, 3 en 5].

6.1 Transitional Waters

In the Netherlands the river basins of Ems-Dollard, Rhine Delta, Meuse and Scheldt have estuaries in the Wadden Sea and North Sea. The river basin of Ems-Dollard is described in combination with the German part of the basin. There are three transitional waters in the Netherlands.

6.1.1 Identification of water bodies

The three transitional waters are located in the Ems-Dollard, the Scheldt and the Rhine Delta river basin districts.

The Ems-Dollard estuary is identified as transitional waterbody. This is the Ems-Dollard estuary which is separated from the mouth of Ems into the Dollard until the geographical line of Ems harbour. Further information on the assignment is described in paragraph 6.1.5.

In the Scheldt river basin district the *Wester-Scheldt* is identified as transitional water.

In the Rhine Delta river basin district de *Nieuwe Waterweg* is identified as a transitional water body. [lit. 5].

6.1.2 Typology

In the Netherlands system B is used to divide transitional and coastal waters into types. The typology of the Dutch water bodies is described in the report 'Typology of Dutch surface waters [lit. 1]. In the Dutch typology all obligatory factors are used for the typology [lit. 1], i.e. salinity and tidal difference. No optional factors were used.

This method results in two transitional water types (O1 and O2) for the Netherlands. O2 is an estuary with moderate tidal range. Since O1 did not occur in the Netherlands it was not further developed. A further explanation on the typology can be found in [lit. 2].

In the Ems Dollard report the Dutch and the German typology is combined (e.g. the names are the same but have different codes). The German type is coded T1 and the Dutch type is coded O2.

6.1.3 Assignment of status

The transitional waters in the Ems-Dollard and the Scheldt have been identified as heavily modified waters. The transitional water from the Rhine district has been identified as artificial water, because it is man made.

6.1.4 Reference conditions

In the Netherlands, the CIS guidelines [lit. 6 en lit. 7] are followed, to describe the reference conditions for the different types of transitional waters. This is described in

paragraph 6.1.2. [lit. 2]. In case of the common German-Dutch Ems-Dollard report, the Dutch reference conditions for the transitional type are described, whereas the German reference conditions are still under development. The reference conditions are not mentioned in the combined Article 5 report for the Ems-Dollard.

The Netherlands have not yet defined standards for determining Good Ecological Status or Good Ecological Potential. In the concept report of Evers, 2006 [lit. 3] proposals are included for setting the physicochemical quality standards.

In the Netherlands, biological, hydromorphological and chemical/physicochemical parameters are used to describe the reference conditions for transitional waters [lit. 6]. Reference conditions for Dutch transitional and coastal waters are described in the STOWA report for all natural water types [lit. 2].

From the required hydromorphological descriptors for transitional waters mean tidal difference and wave height are used in stead of depth variation, structural intertidal zone and wave exposure. An overview of the used descriptors and parameters can be found in annex 4 and 5 respectively.

6.1.5 Risk assessment

Main pressures transitional waters

The main pressures in the Netherlands are described according to the WFD Guidelines [lit. 6]. In the transitional waters of the Netherlands the main pressures for failing to achieve the environmental objectives for 2015 are: point and diffuse sources of pollutants, abstraction and flow regulation pressures, hydromorphological pressures, other human pressures and land use patterns. In the reports the pressures are not always described separately for transitional waters. In that case a general description is given.

Main pressures in the *Ems-Dollard estuary* are point sources (sewage discharges for a few substances), diffuse sources (pressure via canals, rivers and locks, pressures from outside of the area), water abstraction, fisheries, and harbours. There are two main harbours in the Ems-Dollard transitional water body: Ems harbour and Delfzijl. Due to frequent dredging, some substances pose a significant pressure on surface water quality status. For example, in the main shipping routes, high concentrations of tributyl tin (TBT) are present.

In the *Wester-Scheldt* main pressures are point sources (sewage discharges), diffuse sources (nutrients, heavy metals and Polycyclic Aromatic Hydrocarbons (PAHs) caused by atmospheric deposition and shipping) and hydromorphological pressures. The Wester-Scheldt is heavily modified as a result of flood protection measures and shipping lane maintenance. Furthermore, fisheries, shipping, recreation and the supply of polluted water from water bodies upstream causes significant pressure. There are two main harbours in the Wester-Scheldt: Vlissingen and Terneuzen. Shipping causes pollution of the Wester-Scheldt with nutrients, heavy metals, PAHs, polychlorinated biphenyls (PCBs), pesticides and TBT. In the Wester-Scheldt, for some substances up to 90% of the pollution load originates from Flanders, Belgium.

In the *Nieuwe Waterweg (Rhine river basin district)* major pressures are: diffuse sources (agriculture, nutrient leaching from natural grounds, traffic and atmospheric deposition)

and hydromorphological pressures (surface water level control, intensive maintenance, normalisation and intensive draining of the area). For the entire Rhine Delta the intensive pressure on land used by urbanisation and agriculture (surface water level control and discharge of substances) are responsible for the transitional water bodies being at risk. There is also the problem of deposition of pollutions from the coastal waters outside of the Rhine caused by the sea current of the Canal (English Channel). About 80-100% of the pollution pressure in coastal water bodies is due to deposition.

Risk assessment

The chemical risk assessment for transitional waters was done using the provisional current European standards (proposed by the Fraunhofer Institute FHI) to determine the chemical status of a water body. These include standards for both priority substances and 76/464/EG-substances.

For the ecological status of natural water bodies physiochemical and biological standards are used. A final assessment method for biological status of heavily modified transitional water bodies was not yet available. An existing national ecological assessment method was used for the risk assessment. In the Scheldt basin the OSPAR methodology was used in addition.

The risk assessment resulted revealed that all Dutch transitional water bodies (the Ems-Dollard estuary, the Wester-scheldt and de Nieuwe Waterweg are at risk for failing to achieve the WFD objectives by 2015.

6.1.6 Assignment of status

In the river basin districts of the Rhine-Delta and Ems-Dollard all transitional waters have been identified as heavily modified water bodies. De Nieuwe Waterweg (Rhine river basin district) recently has the status of artificial water body [lit. 5] because it was man made. In the Ems-Dollard and Rhine Delta the assignment of status is based on human activities (e.g. canalising, dikes) [lit. 31]. The *Ems-Dollard estuary* and the *Wester-scheldt* have the status of heavily modified waterbody, because of the significant hydromorphological changes for shipping.

6.2 Coastal waters

6.2.1 Identification and delimitation of water bodies

All Dutch coastal water bodies of the river basins districts of Ems, Meuse, Rhine Delta and Scheldt are situated in the ecoregion North Sea.

In the river basin district of the *Scheldt* two water bodies were identified as coastal waters: the Easter-Scheldt and the Zeeuwse coast. The typology is explained in paragraph 6.2.2. The outside coastal zone of the Scheldt is not included in the bordering.

In the *Ems-Dollard* river basin two water bodies are identified as coastal water. The first is delineated from the geographical line Ems-harbour- Pilsum until the east-west line south of Rottumeroog and Borkum. The second is delineated from the east-west line south of Rottumeroog and Borkum until the baseline +1 sea mile of the Wadden Sea. The area outside the 12 nautical miles is not delineated under the WFD.

In the *Meuse* River basin district there is one water body assigned as coastal waters. This is delineated from the end of the Haringvliet till the North Sea.

In the *Rhine* Delta River basin district there are three water bodies assigned as coastal waters. The first two are stretched out along the whole North Sea coastline of the Netherlands. They are split by a horizontal line from Den Helder. The second is the Wadden Sea.

6.2.2 Typology

In The Netherlands system B is used to divide transitional and coastal waters into types. Beside the optional factors the mean substratum composition is used because of its importance in determining the biological composition of coastal waters [lit. 1].

The Dutch typology had originally three distinct coastal water types: K1 (polyhaline coastal waters), K2 (protected polyhaline coastal water) or K3 (euhaline coastal water). In 2006 K3 was merged into type (K1).

6.2.3 Reference conditions

In the Netherlands EU guidelines [lit. 6 en lit. 7] were followed to describe the reference conditions for the different types of coastal waters (par 6.2.2 and lit. 2).

Biological, hydromorphological and chemical/physiochemical parameters were used to describe the reference conditions for coastal waters according to WFD guidelines [lit. 2]. These are reported in national STOWA documents for all natural water types [lit. 2].

From the required hydromorphological descriptors for coastal waters mean tidal difference and wave height are used in stead of depth variation, structural intertidal zone and wave exposure. An overview of the used descriptors and parameters can be found in annex 4 and 5 respectively. The assessment of chemical and ecological status of coastal waters was done with the same of standards as the transitional waters to (paragraph 6.1.3).

6.2.4 Risk assessment

Main pressures coastal waters

The main pressures in the Netherlands are described according to the WFD Guidelines [lit. 6].

For coastal waters of the *Ems-Dollard* river basin district an important pressure is the loading of nutrients from diffuse sources from the southern part of the North Sea and the German hinterland. Another (significant) pressure of the coastal waters is originated from atmospheric deposition of nitrogen. Significant hydromorphological pressures are from dredging in shipping routes, building of the Ems harbour and the harbour sea canal and morphological changes to protect the mainland and the island Borkum against flooding. To facilitate intensive shipping in the area civil constructions and harbour areas have been built and the area is frequently dredged. Shipping is also responsible for a significant emission of TBT. Another significant pressure is fisheries.

In the *Scheldt* river basin an important pressure for coastal waters is supply of polluted water from other rivers basin districts. There are also significant hydromorphological changes due to shipping and protection against flooding. Other pressures in these

coastal waters are fishing, recreation and shipping. Discharge of ballast water is also a problem. In addition, the introduction of the Japanese oyster is a problem in the Easter-Scheldt.

In the *Rhine* Delta River basin district there are three water bodies assigned as coastal waters: the northern part and southern part of North Sea coastline of the Netherlands and the Wadden Sea. A lot of pollution in the coastal waters originates from the Canal (English Channel). This contributes between 80 and a 100% of the total amount of pollution in the coastal zone. There are also significant hydromorphological changes due to shipping and protection against flooding.

In the *Meuse* River basin the main pressure for coastal water bodies are diffuse sources (atmospheric deposition) and hydromorphological pressures.

Risk assessment

All Dutch coastal waters are considered to be at risk for achieving WFD objectives by 2015.

6.2.5 Assignment of status

The two coastal water bodies in the Ems-Dollard district have been identified as Natural waters.

The two coastal water bodies in the Meuse district have both been identified as heavily modified waters.

Two of the three coastal water bodies (Oosterschelde, Zeeuwse coast) from the Scheldt district have been identified as heavily modified and the coastal territorial water has been identified as natural water.

One of the water bodies (zuidelijke Noordzee) from the Rhine district has been identified as heavily modified. The other two water bodies (noordelijke Noordzee and Waddenzee) have been identified as natural waters.

Harbours and shipping routes

Six harbours in the coastal waters of the Rhine delta (Den Helder, Harlingen, Den Oever, Lauwersoog, Oude Schild and West Terschelling and a zone of 500m around them) are assigned as heavily modified water bodies [lit. 5] Ems harbour and Delfzijl are situated in a water body with the status of heavily modified. There is still discussion going on amongst stakeholders in the Wadden Sea region on the status of the harbours.

7 UNITED KINGDOM

7.1 Transitional Waters

On the eastern coast of the United Kingdom the main estuaries into North Sea are the river basins of Northumbria, Anglia, Humber, Solway Tweed, South East, Thames and Scotland. Three of them (South East, Northumbria and Scotland) only partly discharge into the North Sea.

7.1.1 Identification of water bodies

For the transitional waters in the UK two sizes of water bodies are distinguished: smaller than 30 km² and larger than 30 km². The smaller ones refer to small river basins, discharging directly into the North Sea or into larger transitional water. This results in many small transitional water bodies.

The harbours are classified as artificial surface water bodies according to the United Kingdom Technical Advisory Group Guidance (UKTAG-guidance) for artificial water bodies, but these are not specifically mentioned in the WFD Article 5 reports [lit. 8].

7.1.2 Typology

System B is used by the UK to divide transitional and coastal waters into types. In this system the obligatory factors are latitude, longitude, tidal range and salinity. Optional factors of mixing characteristics, mean substratum composition and wave exposure are also used, as these are important in determining the ecology of transitional and coastal waters. This approach results in five transitional water types for England, Wales and Scotland.

7.1.3 Reference conditions

The UK has used biological, hydromorphological and chemical/physiochemical parameters to describe the reference conditions for transitional waters. Criteria were set by the United Kingdom Technical Advisory Group (UKTAG) and used in the assessments. In some districts alternative methods for assessments were used as well.

7.1.4 Risk assessment

The principal objective of the WFD is to achieve good status and to comply with standards by 2015. Because of the difficulty to predict the changes in pressures between now and 2015 the UK has made a general assumption: if a water body is at risk in 2004 it will be at risk in 2015. Although the WFD requires water bodies to be reported as either at risk or not at risk of failing their objectives by 2015, the results are reported using 4 categories agreed by UKTAG. The results of the risk assessment for transitional and costal waters are described below.

The UK distinguished four different degrees of a water body being at risk as determined by the UKTAG to help prioritise future action, including monitoring efforts to focus on the most significant risks and to fill any data or knowledge gaps to increase certainty in the risk assessment results. These four categories are listed below.

‘at significant risk’ of not meeting the environmental objectives of the WFD by 2015 (1a);

'probably at significant risk' (1b);
 'probably not at significant risk' (2a);
 'not at significant risk' (2b).

Main pressures transitional waters

Main pressures for the transitional and coastal waterbodies in the UK: point and diffuse sources of pollutants, abstraction and flow regulation pressures, morphological pressures and other human pressures (introduction of non-native species).

All transitional and coastal waters in the UK are at risk, except for the coastal waters of Solway Tweed and Scotland. The main pressures for transitional waters and coastal waters that cause the transitional and coastal water to be at risk are described below. Table 7.1 gives a summary on the risk percentage for the transitional waters and coastal waters for the different river basins districts.

Table 7.1 Risk percentages for transitional and coastal waters in the UK

Cat.	Northumbria*	Anglian	Humber	Solway Tweed	South* East	Thames	Scotland*
Transitional waters	100% (at risk)	100%	100%	84%	100%	100%	84%
Coastal waters	100% (at risk)	98.6%	100%	9%	100%	100%	17%

* discharge only partly in the North Sea

Summary of water bodies at risk Northumbria

Morphological pressures are significant for transitional and coastal water bodies, accounting for around 90% of water bodies at risk in each water category. Point and diffuse source pollution pressures are also significant in transitional waters

Summary of water bodies at risk Anglian

Morphological pressures are a key cause of risk to transitional and coastal water bodies. Point source pollution pressures account for nearly 60% of transitional water bodies reported at risk of not achieving good status.

Summary of water bodies at risk Humber

There is only one coastal water body, which is at risk from morphological pressures and from the presence of non-native species. All five transitional water bodies are at risk from morphological pressures.

Summary of water bodies at risk Solway Tweed

As can be seen from the table many of the transitional waters are at risk of failing the environmental objectives (about 84% of the total surface area). This is because the Solway Estuary is the largest transitional water body in the district. This is not surprising given the heavy anthropogenic use that occurs there. The larger population centres in the district are situated close to large estuaries and human activity brings with it pressures on the water environment.

Coastal areas have the lowest proportion of water bodies at risk of failing the environmental objectives (about 9% of the surface area). The relatively long coastline on the west of the Solway Tweed is generally not at risk from human activity.

Summary of water bodies at risk South East

The predominant pressures for transitional and coastal water bodies are morphological, accounting for around 90% of water bodies in each category being at risk. The presence of non-native species is also a significant pressure for these water categories. Diffuse pollution pressures account for around a quarter of transitional water bodies and nearly a half of all coastal water bodies being at risk of not achieving good status.

Summary of water bodies at risk Thames

Morphological pressures cause all three coastal waters and all seven transitional waters to be at risk of not achieving good status. Point source pollution pressures are also significant in transitional waters (greater than 40% at risk), and diffuse source pollution pressures account for around a third of coastal waters being at risk.

Summary of water bodies at risk Scotland

Scotland's estuaries are subject to the highest levels of risk of failing the environmental objectives (about 84% of the total surface area). This is not surprising as the largest population centres are close to large estuaries and include some of Scotland's most important industrial sites.

Coastal water bodies have the lowest proportion of areas at risk of failing the environmental objectives (about 17% of the surface area). The Scotland river basin district has a long coastline and the majority of the coastal waters are not considered to be at risk.

7.1.5 Assignment of status

The canals and other 'linear' waters (open water transfers) have been identified as provisionally artificial, but not split into specific water bodies yet. The harbours are classified as artificial surface water bodies according to the TAG-guidance for artificial water bodies, but not specifically mentioned in the WFD Article 5 reports.

7.2 Coastal waters

7.2.1 Identification of water bodies

All coastal water bodies in the river basins of Northumbria, Anglian, Humber, Solway Tweed, South East, Thames and Scotland are located in the ecoregion 'North Sea'. See transitional waters for further information.

7.2.2 Typology

In the UK system B is used to divide transitional and coastal waters into types. The same obligatory factors and optional factors are used as those chosen for transitional waters. This results in eight different types of coastal waters. See transitional waters for further information.

7.2.3 Reference conditions

See transitional waters for further information.

7.2.4 Risk assessment

See transitional waters for further information.

7.2.5 Assignment of status

See transitional waters for further information.

8 ANALYSIS OF DIFFERENCES AND SIMILARITIES

The previous chapters have given a brief description of five important aspects of the river basin characterisation reports for each country separately. This chapter will try to make a cross-section through each aspect in order to identify differences and similarities in approach and list the pros and cons. The differences in particular might reveal issues that might call for harmonisation and thus be of importance for HARBASINS project.

8.1 General observations

In general the Article 5 reports provide no more or less than the information required by the WFD and listed in the WFD annexes. The reports show the results rather than the methods applied and criteria used. Political arguments and discussions behind the choices which might have influenced the identification and boundary setting of the water bodies are not presented. This makes it difficult to compare the motives and methods used by the different countries by analysing the reports only. The WFD does not describe an approach, but prescribes the obligatory elements of the reports. Although all the countries implemented these obligatory elements the contents vary (considerably) between the countries. Table 8.1 gives an overview of all the administrative bodies of the member states.

Table 8.1: overview of the administrative bodies for the member states.

Country	Administrative body
Belgium	Federale regering van België (FOD Volksgezondheid, Veiligheid van de voedselketen en Leefmilieu). Commissie Integraal Waterbeleid
Denmark	Miljøministeriet
Germany	Ministerium für Umwelt, Naturschutz und Reaktorsicherheit
The Netherlands	Ministerie van Verkeer en Waterstaat
United Kingdom	Environmental Agency : Water framework directive team Scottish Environment Protection agency.

It is possible and even likely that the information we were looking for is published in other background documents or informal working reports. This is a task for the next phase of Harbasins workpackage 1.

Furthermore, it can be assumed that the Article 5 reports do not fully corresponds to the current state-of-affairs and that increasing insight has already led to changes. In designing the monitoring network (due December 2006) member states may have changed views on water body identification, as was the case in the Netherlands.

8.2 Identification of water bodies

Motives for identifying and separating water bodies are often not implicitly described in the reports. It is clear that member states use differences in ecological types for separating water bodies. But in cases with two adjacent water bodies of the same type, it is often not explained what the reason behind this division is. The reason may be found in territorial borders from national or regional water management authorities. Also State borders are used as a border of water body, indicating the border of a river basin district.

The reports show relatively little attention for coastal and transitional waters compared to inland waters. The number of fresh water bodies in a river basin (rivers and lakes) is often very high compared to the number of coastal and transitional waters. Also the attention in the texts is fairly limited.

It can be concluded that the size of the water bodies in coastal and transitional waters can vary considerably between countries. This might be the result of both real existing and homogeneous water systems of different size but might also be the result of practical reasons regarding the requirements that have to be met for each water body, like the size of the monitoring programme.

We found different approaches in the way the crossing borderline between transitional waters and coastal waters were drawn. For example in the Netherlands and in the Ems estuary the estuary is identified as partly transitional water and the outer parts as coastal water. However, the Weser and the Elbe estuaries are both identified as transitional waters. The identification at this point is not applied equal in all estuaries. This might be the result of different approaches and political choices in the respective areas.

A same kind of conclusion can be drawn for the level crossing lines between transitional waters and fresh waters. In the German Eider the borderline is at the tidal effect boundary. For the Elbe the fresh water – salt water borderline is used. The identification at this point is not applied equal in all estuaries.

Harbours and shipping routes

The WFD has no specific requirements and guidance for the identification of harbours and shipping routes. However, as a result of the discussions in the Netherlands special attention was given to the question how harbours and shipping routes in other countries were treated in the Article 5 reports.

This comparison study shows that in some countries harbours and shipping routes have not been identified separately and are within the borders of a larger water body. Often these larger water bodies are associated with significant hydromorphological pressures and changes.

In the Netherlands, Belgium and Germany, most harbours are specially delineated and classified as artificial water bodies. In the Netherlands, harbours and a zone of 500m around each harbour are classified as separate water bodies for example. Because harbours are man made and are subjected to high morphological changes, these water bodies are assigned heavily modified water body status in the Netherlands. But there is still discussion on this issue with stakeholders in the region.

Shipping routes in The Netherlands are separate waterbodies.

Semi-aquatic areas

An important feature of coastal waters like the Wadden Sea is the occurrence of semi-aquatic areas or salt marshes. In the Netherlands there was a serious debate whether these areas should be part of the water body or not.

This debate/choice is not mentioned in Article 5 and it was not clear from the maps in the reports if these marshes are included if present. Also in reports from other countries this aspect was not mentioned.

8.3 Typology

The definition of the water body types vary along the North Sea coast.

Relevant questions for comparison of typology are:

Was system A or B used to design the typology?

Are there similarities in optional descriptors?

Is it possible to design a common typology for the North Sea region?

Table 8.3. Overview of the amount of types and the amount of waterbodies in the different countries.

Country	Transitional waters		Coastal waters	
	Amount types	Amount distinct waterbodies	Amount types	Amount distinct waterbodies
Belgium	O1 and O2	11	K1 and K3	2
Netherlands	O1 and O2	3	K1 and K3	9
Germany	T1(=O1)	5	N1, N2, N3, N4, N5	25
Denmark	-	-	15	211
United Kingdom	5 (different system)	32	3 (different system)	17

System A of B

All countries have chosen system B with all obligatory and a varying number of optional descriptors. Optional descriptors were often mixing characteristics and mean substratum composition. There are however, some differences in the naming and coding of the descriptors. This is especially important for water bodies next to country borders. It should be investigated if different types in neighbouring countries, which are reported to be based on the same descriptors, are actually the same. The consequence of this would be that the reference conditions and ecological assessment method could and maybe should be harmonised.

In all cases where water bodies align with national borders the types were already coordinated by the countries. In this case a part of the typology was made jointly. This was for instance the case in the international Ems-Dollard river basin between Netherlands and Germany and in the Scheldt river basin between Netherlands and Belgium. The United Kingdom coasts clearly differ in type from the continental coastal areas. Therefore harmonisation in typology between United Kingdom and the main land seems to be not possible.

8.4 Reference conditions

Reference conditions are to be described for all natural water types. The description should cover biological, physicochemical and hydromorphological quality elements.

Relevant questions for comparison of typology are:

Are all quality elements covered?

What is the level of detail of the description? Is it qualitative or quantified in numbers of species or abundances?

What were reasons not to cover all?

Although in all documents the quality elements are mentioned, only the Belgian and Dutch documents explicitly show in which way this was done. England refers to the EUNIS classification and Germany does not mention the details how they set up their reference conditions. This makes it difficult to compare the methods.

In all documents, difficulties in describing reference conditions are mentioned, due to the long history of human activity and lack of historical data. The lack of historical data made Germany and the United Kingdom decide not to describe these conditions yet. Coastal and transitional waters were often described in less detail than in case of fresh water types. For example, in the UK modelling was used for fresh waters, but not available for transitional and coastal waters.

8.5 Risk assessment

Relevant questions for comparison of typology are:

What is in general the result of the risk assessment?

What are the common pressures?

Was the result of the risk assessment determined by chemical, biological or both quality elements?

Pressures and result of risk assessment

The pressures causing water bodies to be at risk vary between the countries. The main pressures mentioned almost in all Article 5 Reports are:

- Emissions from agriculture in the catchment.
- supply from other river basins.
- hydromorphological changes for flood protection and shipping.

Most coastal and transitional water bodies in the river basins studied are considered to be at risk. Exceptions are the coastal waters of Scotland, and Solway Tweed, which are only partly assigned to the North Sea ecoregion. In the United Kingdom the risk assessment is expressed as a percentage of the surface of the water body being at risk. Furthermore, four categories of risk are distinguished. This differentiates the results of the risk assessment and offers more information than just at risk or 'not at risk'.

The WFD risk assessment follows the 'one-out all-out' principle: if a single priority substance exceeds the environmental standard or a single biological quality element is not classified as good, the overall status is not sufficient and thus at risk. As a result of this method almost all transitional and coastal waters in all countries studied are considered to be at risk.

It would be relevant to study what the strategy of the member states will be to cope with water bodies at risk and what hydromorphological pressures are considered to be irreversible. Are they bound to be assigned as heavily modified water bodies or is lowering the objectives or delaying deadlines (exemption) considered? This will be a task for the next activity of the Harbasins project.

There are connections to other Harbasins work-packages:

- Heavily modified water bodies: modelling and criteria.
- Transitional waters – habitat gain and loss.
- How to deal with transboundary pollution (RBD).

9 RELATION OF WFD WITH BIRDS AND HABITATS DIRECTIVE AND ICZM

HARBASINS is aiming to enhance compatibility of management strategies and international cooperation for the North Sea's coastal waters and estuaries. This implies harmonisation of the implementation of EU Water Framework Directive and coordination with other European legislation and international agreements. This document analysis focuses on the Birds and Habitats Directive and ICZM recommendations as most relevant at this moment. It was studied if and to what extent the Article 5 reports consider or reflect to or consider both regulations, while realising that this is not a obligatory WFD requirement. The essentials of both regulations are introduced in paragraphs 9.1 and 9.2.

9.1 Birds and Habitats Directive (Natura 2000)

Birds Directive (*'Council Directive 79/409/EEC on the conservation of wild birds'*)

The Birds Directives main goal is regulate the protection and management of all wild (European) birds and their habitats on European soil. The Member States are required to take measures to protect the habitats of protected bird species. Measures for migratory birds are included. The focus is on protecting wetlands that are of international importance (Council Directive 79/409/EEC, 1979).

The Birds Directive identified 193 endangered species and sub-species for which the Member States are required to designate Special Protection Areas (SPAs). Over 4.000 SPAs have been designated to date, covering 8% of EU territory. As a result of this action, some severely threatened species are now beginning to recover. There is still a lot of work to do before we have the necessary SPA network in place to ensure the conservation of Europe's most vulnerable birds (EC, 2006) [lit.32].

Habitats Directive (*'Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora'*)

The Habitats Directive aims to protect other wildlife species and habitats. Each Member State is required to identify sites of European importance and to put in place a special management plan to protect them, combining long-term conservation with economic and social activities, as part of a sustainable development strategy (EC, 2006). Member States are required to take measures for the protection of natural habitats and the habitats of specific species. Specific species refers to species listed on Annex II of the Directive and habitat types listed on Annex I. In addition, the Directive imposes strict protection for all species important for the EU as a whole. These species are listed on Annex IV. These sites, together with those of the Birds Directive, make up the Natura 2000 network - the cornerstone of EU nature protection policy. The Natura 2000 network already comprises more than 18 000 sites, covering over 17% of EU territory, and is due to be completed in 2005 for EU 15. It is co-financed through the Commission's LIFE programme (set up in 1992 to develop EU environmental policy) and other Community finance instruments (EC, 2006) [lit.32].

Natura 2000

To preserve the natural values available in the European Union (EU), the EU has initiated Natura 2000. This is a connected network of protected areas stretching across the borders of European Member States (LNV, 2006) [lit.33].

In 2001, when EU heads of state and government launched the EU Sustainable Development Strategy in Gothenburg, they declared that the decline in biodiversity must be halted by 2010. A '2010 target' also exists at the international level: during the 2002 World Summit on Sustainable Development in Johannesburg, world leaders committed themselves to significantly reducing global biodiversity loss by 2010 (EC, 2006). This network represents the cornerstone of the EU policies for halting the loss of biodiversity on European soil by 2010.

The network comprises all areas that are protected through the Birds Directive and the Habitats Directive. The network has not yet been completed. Several Member States are still in the process of designating the necessary protected areas (LNV, 2006).

Relation between BHD and WFD

The BHD (or Natura 2000) differs in focus and set-up from the WFD:

BHD concerns the protection of habitats and species whereas the WFD relates to overall water ecosystem quality, both the biological and the environmental aspect; BHD concerns certain specifically designated areas whereas WFD applies to entire catchments and its water systems;

Identification of WFD water bodies and Natura 2000 areas was done independently because their time frames are not synchronized;

The Directives are sectorial (water, birds, etc.) and therefore sectorial interest may rise difficulties in implementation. At local levels small conflicts can occur, but they are of minor importance compare to the major pressures like anthropogenic pollution from agriculture.

9.2 Integrated Coastal Zone Management

Many of Europe's coastal zones face problems of deterioration of their environmental, socio-economic and cultural resources. Since 1996, the European Commission has been working to identify and promote measures to remedy this deterioration and to improve the overall situation in our coastal zones.

From 1996 to 1999, the Commission operated a Demonstration Programme on Integrated Coastal Zone Management (ICZM) designed around a series of 35 demonstration projects and six thematic studies. This programme was aimed to:

- Provide technical information about sustainable coastal zone management, and
- Stimulate a broad debate among the various actors involved in the planning, management or use of European coastal zones.

The programme was intended to lead to a consensus regarding the measures necessary in order to stimulate ICZM in Europe

In 2000, based on the experiences and outputs of the Demonstration Programme (all of which are available online at europa.europa.eu/environment/iczm/demopgm.htm), the Commission adopted two documents:

- A Communication from the Commission to the Council and the European Commission on 'Integrated Coastal Zone Management: A Strategy for Europe' (COM/00/547 of 17 Sept. 2000).
- A proposal for a European Parliament and Council Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe (COM/00/545 of 8 Sept. 2000). This Recommendation was adopted by Council and Parliament on 30 May 2002.

The Communication explains how the Commission will be working to promote ICZM through the use of Community instruments and programmes. The Recommendation outlines steps which the member states should take to develop national strategies for ICZM. The national strategies are due for Spring 2006 and should involve all the coastal stakeholders.

The working group on indicators and data established two set of indicators, one aimed to measure progress in ICZM, the other one measuring sustainability on the coast. The indicators which relate to WFD aspects are listed in the following table:

Table 9.1: ICZM indicators that relate to WFD aspects

7	Area of semi-natural habitat – Area of semi-natural habitat
8	Area of land and sea protected by statutory designations – Area protected for nature conservation, landscape and heritage
10	Change to significant coastal and marine habitats and species Status and trend of specified habitats and species Number of species per habitat type Number of Red List coastal area species
16	Quality of bathing water (Percentage of bathing waters compliant with the guide value of the European Bathing Water Directive)
18	Concentration of nutrients in coastal waters (Riverine and direct inputs of nitrogen and phosphorous to inshore waters)
19	Amount of oil production <ul style="list-style-type: none"> • Volume of accidental oil spills • Number of observed oil slicks from aerial surveillance
23	Fish stocks and fish landings <ul style="list-style-type: none"> • State of the main fish stocks by species and sea area • Recruitment and spawning stock biomass by species • Landings and fish mortality by species • Value of landings by port and species

9.3 Implementation

9.3.1 Belgium

The Article 5 reports of the Scheldt river basins and the North Sea (which was drafted later on) and the ICZM report do not refer to each other. Also there is no reference to the Birds and Habitats directive in the Article 5 reports. The reports result from separate goals, circuits and independent timeframe.

9.3.2 Denmark

The ICZM report of Denmark is not referring to the Water Framework Directive or to the Birds and Habitats directive.

9.3.3 Germany

In Germany the ICZM report examines the interactions between the coastal sea and the transitional waters in accordance with the Water Framework Directive. The WFD guidelines are an important component for implementation process of ICZM. Therefore it's important to expand the use of the WFD.

The federal government has improved the set of legal instruments by transposing European legislation under which the Water Framework Directive as well as the Natura 2000 directive. In the evaluation of the implementation and application of the legal provisions and policies of the Community special attention is given to the contributions of the NATURA 2000 directive and the WFD to development of an integrative set of legal instruments and a high level of protection.

9.3.4 The Netherlands

The Dutch ICZM report begins by describing the current status of the Dutch coastal zone itself, using the 'sustainability indicators' formulated by an EU group of experts working together with representatives of all the member states. Secondly, it compiles of the organisational arrangements for coastal zone policymaking and management, and analyses the extent to which they promote integrated management. Finally, the report examines the influence of EU legislation on the current practice of coastal zone management in the Netherlands [lit.25]. The WFD is not mentioned in the ICZM report. The subjects discussed in the ICZM report concern i.e. spatial development, tourism, land use and social factors.

In the Article 5 reports of The Netherlands, the relation with ICZM and the Birds and Habitats Directive is not mentioned.

9.3.5 United Kingdom

In December 2005 Defra and the Welsh Assembly Government jointly published a consultation on River Basin Planning Guidance, which set out the principles and key steps for the river basin planning process. Structures to ensure proper public participation under the WFD have been introduced across the UK in order to help develop draft River Basin management plans (RBMPs) by 2008. These will need to link with existing coastal groups already established and promoting an ICZM approach.

In the Article 5 reports of the UK no reference is made to ICZM or the Birds and Habitats directive.

10 CONCLUSIONS AND RECOMMENDATIONS

This document analysis is part of the Interreg IIIB Harbasins project (Workpackage 1). The main aim of the study was to examine the status of the implementation of the Water Framework Directive in member states along the North Sea and to study the relation with Birds and Habitats Directives and Integrated Coastal Zone Management. This is the first time that such a comparative analysis is made to identify and select issues that can benefit from harmonisation between river basins or countries. More than 20 river basin reports from Belgium, Denmark, Germany, United Kingdom and the Netherlands were studied.

10.1 General conclusions on WFD Article 5 report document analysis

This report presents a unique document analysis. It is the first time a comparison is made of the Article 5 reports from five different countries that have coastal areas at the North Sea. This document analysis is a snap shot in time, only based on the Article 5 reports that were delivered by the end of 2004 to the European Commission. This document elucidates the differences in methods used in these countries according to Article 5 of the WFD.

We have to emphasize that the data reported in the Article 5 report may currently be outdated (pers. comm. and more recent documents) due to new insights. The reasons for these updates are of particular interest for exchange in order to achieve a common level playing field in the WFD implementation.

Differences between the reports appear in the way reference conditions, delimitation of water bodies, typology and risk assessment (see 10.2). These factors are essential and in big need of harmonization.

Transitional and coastal waters get relatively little attention in the reports compared to inland waters (categories rivers and lakes). Also there is little or no attention for the relation with the North Sea outside the 12 mile zone, because this is not a requirement.

The river basin characterisation reports are published and delivered to the European Commission by the member states. The WFD requirements are very strict and followed thoroughly in all reports. As a consequence, the reports present only the results of a process of identification, typification and description rather than the motives, arguments and scientific discussions behind the screens during the process. It appeared to be hard to find information on the political process in the reports. This implies that the document analysis can only partially contribute to identification of topics for harmonisation. Member states are not able to learn about practices, motives and applied methodologies in neighbouring countries only from the Article 5 report. An efficient way to find out about the political motives and discussions is to interview people in the different countries who are directly connected to the WFD. One step further, workshops will be organised to improve interaction, discussion and harmonisation.

=> It is recommended to use interviews with key persons in the WFD implementation process to get more detailed and the most actual information on the applied methods and practical or theoretical motives.

=> It is recommended to focus more on exchange of practices and methodologies between member states in the areas where international guidances provide freedom of interpretation. This can be done by organising workshops.

10.2 Conclusions on specific topics

Some issues were selected to look into more detail. This was done from experiences of public discussion in the Netherlands and might be recommended to study in the next phase of Harbasins.

Identification of water bodies: harbours and shipping routes

There appears to be no common approach for identification of harbours. In some river basins they are identified as (small) separate water bodies and in others they are part of a larger water body.

=> it is recommended to study the motives and learn from the benefits from the approach in other basins and possibly to identify a 'best practice' in coping with harbours. Also for shipping lanes a common approach is lacking.

Identification of water bodies: semi-aquatic areas or salt marshes

Salt marshes often represent important natural or semi-natural values that might be different from the coastal or transitional water body. The consequences of including or excluding these areas from the water body are interesting to compare. However, the attention and level of detail in the Article 5 reports on coastal and transitional waters is low compared to inland waters and as a consequence there is no information on salt marshes. There might be a strong relation with the Birds and Habitats Directives, but this is not reported.

=> It is recommended to discuss the approaches to salt marshes in other countries in the workshops and develop a common approach, also coordinated with BHD.

Typology

It is clear that typological differences do exist along the North Sea coast and estuaries, but there might be similar types occurring in different member states. Often the same descriptors are used. Some effort for harmonisation of typology for coastal and transitional waters was made for the intercalibration exercise. This however concerns only a few types. Furthermore there is still discussion on the types. If the optional factors used are the same in several member states, further harmonisation might be possible.

=> It is recommended to discuss the need for a common typology of North Sea water bodies. This may help member states to define reference conditions by geographical comparison in case of lacking historical data.

Reference conditions

The WFD and the CIS-guidances provide general guidelines for the description of the reference conditions for water types by means of biological, chemical and hydromorphological quality elements. Especially in the case a member state has no actual reference situations available; it would be very good to learn from the neighbours how they dealt with that problem. Also the problem of expressing the reference conditions in (quantified) numbers is of scientific interest and would urge for

harmonisation. In addition a satisfactory description of good ecological status is still a point of discussion.

=> It is recommended to examine and discuss the need for a common typology for the North Sea countries and consequently the need to harmonise the descriptions of the reference conditions and to determine a comparable method for defining good ecological status in coastal and transitional waters.

Risk assessment

The WFD prescribed two options for the water bodies: being 'at risk' or 'not at risk'. A water body is at risk if just one of the priority substances exceeds the standard or one of the biological quality elements is not classified as good status. As a result, most of the water bodies in every country are at risk. Therefore the risk maps do not show any distinction in severeness. In applying four categories, the UK however has come up with a different approach which provides more resolution.

Assignment of status

In the Article 5 reports the status assignment of heavily modified water body is provisional. The consequences of this assignment are important because member states have to show that the environmental objectives of GES (as for natural waters) can not be achieved due to irreversible hydromorphological impacts, or disproportional costs are at stake, environmental damage will occur or other sectors are impacted. For heavily modified water bodies specific objectives (GEP) and 'reference' conditions (MEP) have to be defined. In this area a great number of aspects are important that justify thorough discussion and exchange of approaches between member states.

=> It is recommended to point out the assignment of the heavily modified water body status as an important opportunity for exchanging information on practices and potentially harmonisation. One of the goals of Harbasins is to develop the criteria of the heavily modified water body status.

10.3 Conclusions on the relation with BHD (Natura 2000)

The requirements for the Article 5 reports do not consider the relation with Birds and Habitats Directives. As a consequence, the reports show little reference to the BHD. The BHD differs in set-up from the WFD and concerns the protection of species and habitats, while the WFD strongly relates to water quality. Often it is not (yet) clear what the water quality requirements are for the Natura 2000 areas. The identification of WFD water bodies and Natura 2000 areas was often done independently and by different administrative bodies.

The WFD and the BHD are sectorial and here some differences can occur, but their main objectives coincide. At local levels small conflicts can occur, but they are of minor importance compare to the major pressures.

=> It is therefore recommended to study the linkage of the WFD and the BHD and synergies in more detail in the next phase of Harbasins especially for the objectives, monitoring and assessment.

10.4 Conclusions on the relation of WFD and ICZM

The requirements for the Article 5 reports do not consider the relation with Integrated Coastal Zone Management regulations. As a consequence, there is little or no attention for this relation found in the reports during document analysis. However, there are some overlapping objectives and indicators. In general it can be concluded that ICZM report is focusing on human uses while WFD is dedicated to water ecosystem quality.

It is found from personal communication that some member states are in favor of turning the ICZM recommendations into a real EU Directive and other states are against. The latter is likely to give little attention to the recommendations and provide only a basic report without much reference and cross links to other sectors and regulations.

10.5 Recommendations for WP1 next project phases

In this document differences between countries who have coastal areas around the North Sea could be identified and some of the differences are in high need of harmonisation.

This document analysis could fulfil only partially the objective to identify issues and opportunities for harmonisation. This is due to the fact that the Article 5 reports are strictly restricted to the requirements and describe a status in 2005 reflecting the official opinion rather than the political discussions. One should consider that these Article 5 reports are a snap shot in time and reflect the situation at the time of reporting. New evaluations have been made and changes have occurred.

The analysis shows that there are several opportunities in the next steps of the WFD implementation for harmonisation and a chance of improving the comparability of instruments and methods.

There is a need for transboundary harmonisation especially for the BHD and the WFD with regards to monitoring assessment and management.

Based on the Article 5 reports analysis, the next phase of WP1 with interviews and workshops will provide details and insight into the political discussions and changes in the implementation since the Article 5 was delivered.

It is likely that the next steps in the WFD implementation are even more important for harmonisation between member states and of importance for coastal waters:

- development of the (transboundary) monitoring network;
- approaches and motives for the final assignment of status to water bodies;
- developing the environmental objectives for non-natural water types.

It is recommended for the next WP1 project phases to shift focus from ICZM to the European Marine Strategy and the future Marine Water Framework Directive and the BHD because this has to be coordinated carefully with the Water Framework directive.

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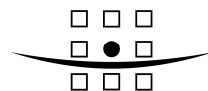
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Annex 2

Overview used descriptors for transitional waters

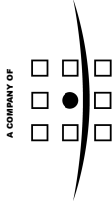
Quality elements	Descriptors WFD Transitional waters	Schedt	Weser, Eider and Elbe	Netherlands	UK
Biological	Phytoplankton Other aquatic flora benthic invertebrate fauna fish fauna	Phytoplankton Other aquatic flora (macroalgae and angiosperms) benthic invertebrate fauna fish fauna	Phytoplankton is not used, rest as required in the WFD	Same as WFD	in addition to types, more specific description of reference condition are developed
Hydromorphological	Fresh water flow Quantity structure and substrate	as required in the WFD	as required in the WFD	as required in the WFD	As required?
Physiochemical	Depth variation Structure Intertidal zone Wave exposure transparency thermal conditions oxygenation conditions salinity Nutrient conditions	as required in the WFD	as required in the WFD	mean tidal difference wave height	In addition to obligatory factors, mixing characteristics, mean substratum composition and wave exposure were used
Information used		Based on type specific ecological assessment methods and expert judgement	Historical data and expert judgement	Based on type specific ecological assessment methods, historical data and expert judgement	Based on type specific ecological assessment methods and expert judgement



ROYAL HASKONING

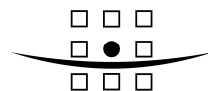
Annex 3

Overview used descriptors for coastal waters



ROYAL HASKONING

Quality elements	Descriptors WFD Coastal waters	Scheldt	Weser, Eider and Elbe	Netherlands	UK
Biological	Phytoplankton, Other aquatic flora benthic invertebrate fauna	Angiosperms (=other aquatic flora) and benthic invertebrate fauna	Same as required in WFD	Same as required in WFD	
Hydromorphological	Quantity, structure, and substrate Direction of dominant currents	Same as required in WFD	Same as required in WFD	Same as required in WFD	
Physiochemical	Depth variation Structure Intertidal zone Wave exposure	Same as required in WFD	Same as required in WFD	Mean tidal difference, wave height, water depth coastal waters	



ROYAL HASKONING

Annex 4

Type and status of the water bodies

Belgium

Schelde

Name water body	Type	Status
Durme (198)	Transitional water O1	Heavily modified
Schelde 1 (193)	Transitional water O1	Heavily modified
Schelde + rupel (194)	Transitional water O1	Heavily modified
Schelde 3 (195)	Transitional water O1	Heavily modified
Schelde 4 (192)	Transitional water O1	Heavily modified
Dijle en Zenne	Transitional water O1	Heavily modified
Nete-Grote Nete- Kleine Nete (191)	Transitional water O1	Heavily modified
IJzerestuarium	Transitional water O2	Heavily modified
Haven Oostende	Transitional water O2	Artificial
Haven van Blankenberge	Transitional water O2	Artificial
Haven Brugge	Transitional water O2	Artificial
Het Zwin	Coastal water K1	Natural
Noordzee	Coastal water K3	Natural

O1= macrotidaal laaglandestuarium

O2= Mesotidaal laadlandestuarium

K1= Mesotidaal zeegat of zeearm

K3= Mesotidaal, euhalien, onbeschut en zandig

Literature

CIW, 2005. Artikel 60 rapport (artikel 5 KRLW) SDG Schelde, Coördinatiecommissie integraal waterbeleid. maart 2005. Rapportage
<http://www.ciwvlaanderen.be/uploads/b671.pdf>

FOD Volksgezondheid, Veiligheid van de voedselketen en Leefmilieu, 2006. Rapport Richtlijn 2000/60/EC- artikel 5 voor de Belgische kustwateren.

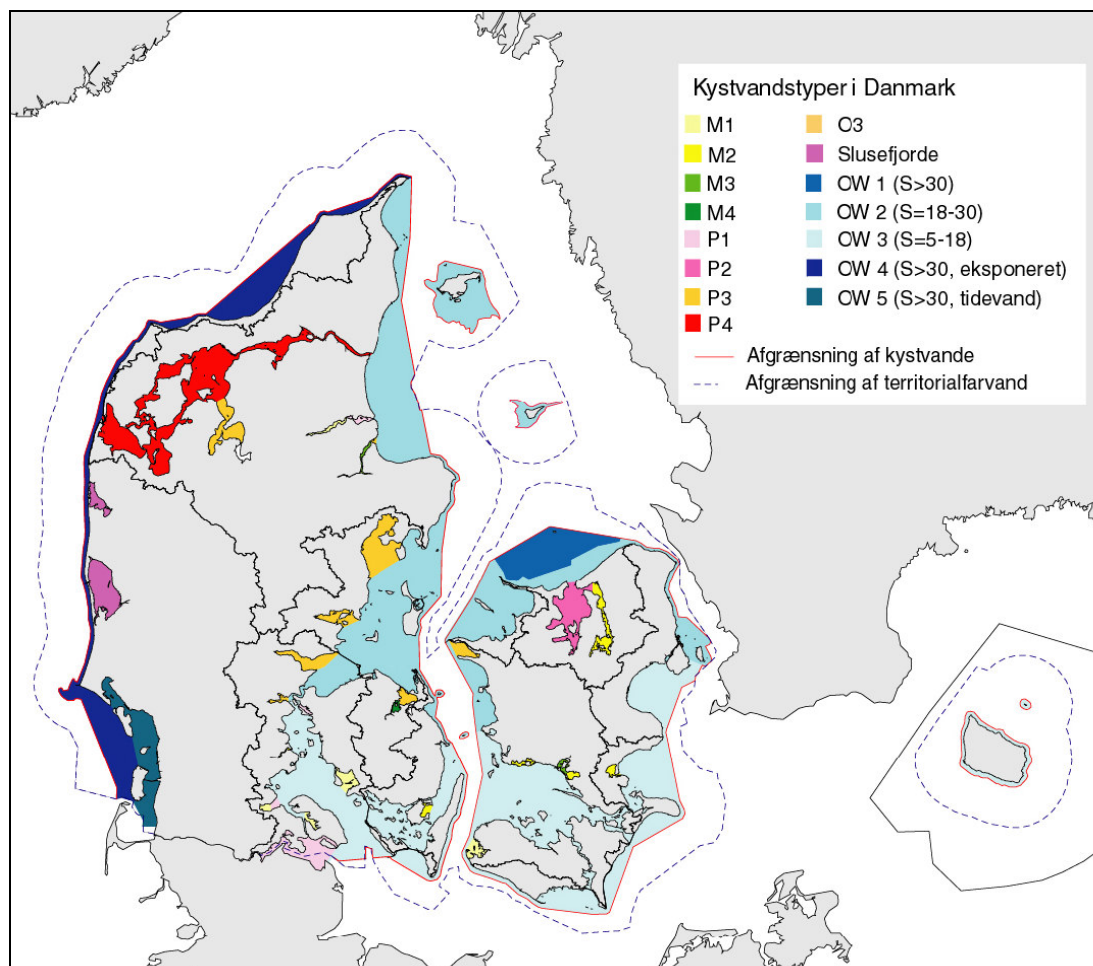
Missing data

No map with water bodies available.

There is a map with the surface water bodies. This maps however only shows the rivers and the coastal water bodies, the transitional water bodies are not on the map.

Denmark

Map of the different types of coastal waterbodies in Denmark



Different types of open coastal stretches

Name water body	Type
West coast Jylland	OW4
Wadden Sea (Vadehavet)	OW5
Deeper parts of Kattegat north of Sjælland	OW1
Kattegat and northern Belt Sea, Little Belt bridge and north of Drogden	OW2
Southern part of Belt sea and Western Baltic Sea, Little Belt bridge and south of Drogden	OW3a
Western Baltic Sea, Coast of Åbne, Bornholm	OW3b

Different types of fjords

Name water body	Type
Indre Randers fjord	O3
Augustenborg fjord, Helnæs bugt, Nakskov fjord, Indre Åbenrå fjord, Indre Mariager fjord	M1
Roskilde fjord, Dybsø fjord, Præstø fjord, Holsteinsborg nor, Lunkebugten	M2

Name water body	Type
Karrebæk fjord, Centrale Randers fjord, Holckenhavn fjord	M3
Indre Odense fjord	M4
Flensborg fjord, Gamborg fjord, Ydre Åbenrå fjord, Ydre Mariager fjord	P1
Isefjord	P2
Århus bugt, Horsens fjord, Vejle fjord, Kalundborg fjord, Kolding fjord, Skive fjord, Lovns bredning, Risgårde bredning, Ydre Randers fjord	P3
Nissum bredning Thisted bredning, Kås bredning, Løgstør bredning, Nibe bredning,	P4
Ringkjøbing fjord, Nissum Fjord	Slusefjorde

Activities that have a direct effect on the environmental status (Danish)

Aktivitet	Direkte påvirkning af miljøtilstand		
	Biologiske forhold	Hydromorfologiske forhold	Fysisk-kemiske forhold
Påvirkningstype			
Spildevandsudledning, inkl udsivning fra depoter o.lign.		X	X
Kølevand		X	X
Regulering/rørlægning/kystbeskyttelse	X	X	X
Dræning		X	X
Klapning	X	X	X
Vedligeholdelse af vandløb og sejlrender	X	X	X
Dambrug	X	X	X
Havbrug	X		X
Råstofindvinding	X	X	X
Søtransport	X		X
Erhvervsfiskeri	X		X
Energiproduktion (incl. vandkraft og havvindmøller)	X	X	X
Indvinding af overfladevand		X	
Landbrugsdrift			X
Vandindvinding i opland		X	-
Badning			X
Anden rekreativ anvendelse	X		X

Literature

Basisanalyse del 1. Karakterisering af vandforekomster og opgørelse af Påvirkninger. Miljøministeriet, Miljøstyrelsen.

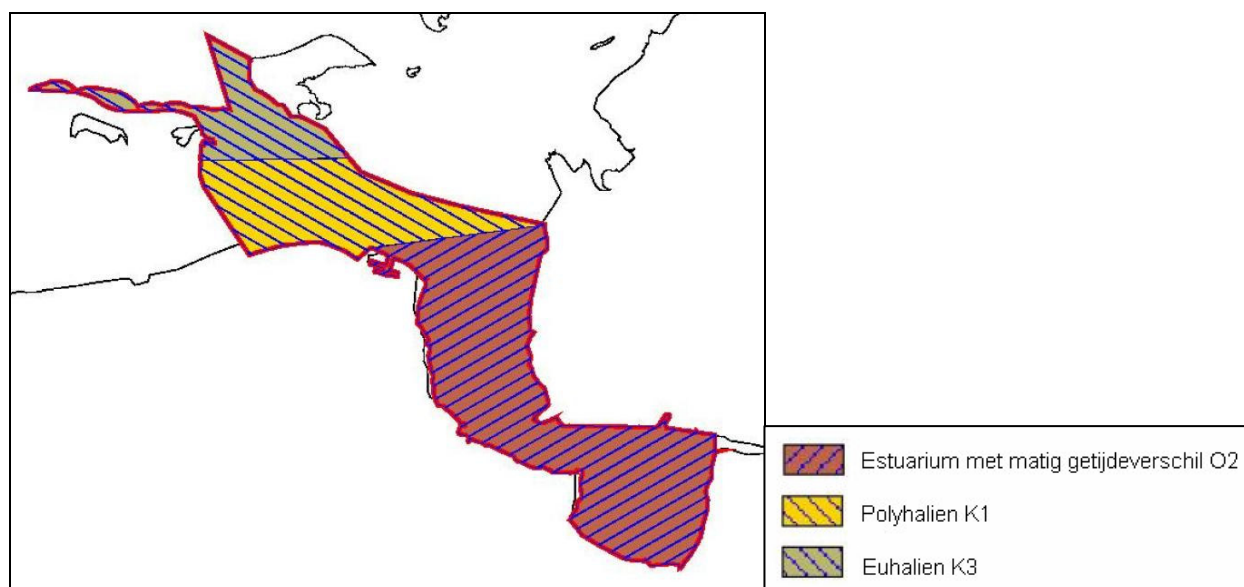
Basisanalys del II Rapportering. Redegørelse for amternes vurdering af vandforekomsternes tilstand (Miljøstyrelsen 5. juli 2006)

Netherlands

Name	Type	Status
Overgangs water Ems	Transitional water O1	Heavily modified
Ems-pilsum until Rottumeroog	Coastal water K1	Natural waters
Rottumeroog until 1 seamile	Coastal water K3	Natural waters

Ems-Dollard

Map of the transitional and coastal water bodies of the Ems-Dollard and the designated types



Literature

Ministerie van verkeer en waterstaat, 2005. Karakterisering Deelstroomgebied Ems-Dollard, Rapportage volgens artikel 5 van de Kaderrichtlijn Water (2000/60/EG). Maart 2005.

Meuse

Name water body	Type	Status
Haringvliet tot Noordzee	Coastal water K3	Heavily modified
Noordzee	Coastal water K3	Heavily modified

Map of the transitional and coastal water bodies of the river district Meuse and the designated types



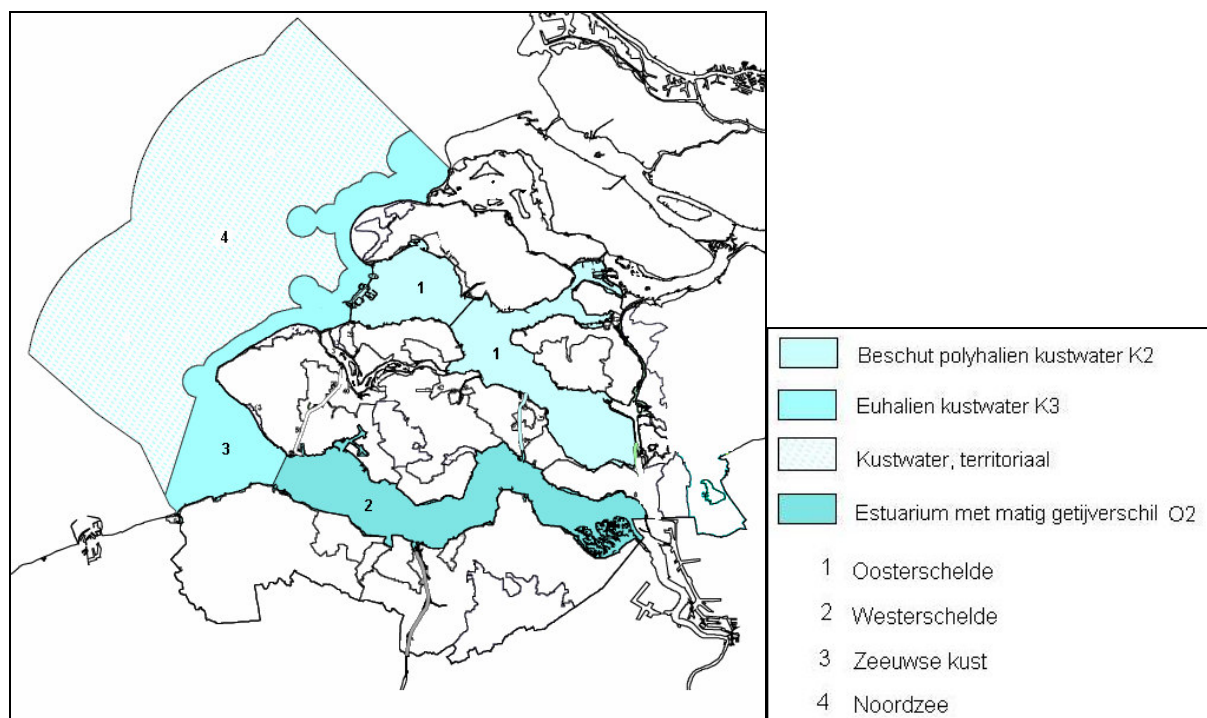
Literature

Internationale maascommissie, 2005. Internationaal stroomgebiedsdistrict Maas-Analyse, overkoepelend rapport (Kaderrichtlijn Water). Maart 2005

Scheldt

Name water body	Type	Status
Oosterschelde (1)	Coastal water K2	Heavily modified
Westerschelde (2)	Transitional water O2	Heavily modified
Zeeuwse kust (3)	Coastal water K3	Heavily modified
Noordzee (4)	Kustwater territoriaal	

Map of the transitional and coastal water bodies of the river Scheldt and the designated types



Literature

Ministerie van verkeer en waterstaat, 2004. Karakterisering stroomgebied Schelde, rapportage van Nederland over de invulling van de Kaderrichtlijn Water in het Stroomgebied Schelde conform artikel 5. November 2004.

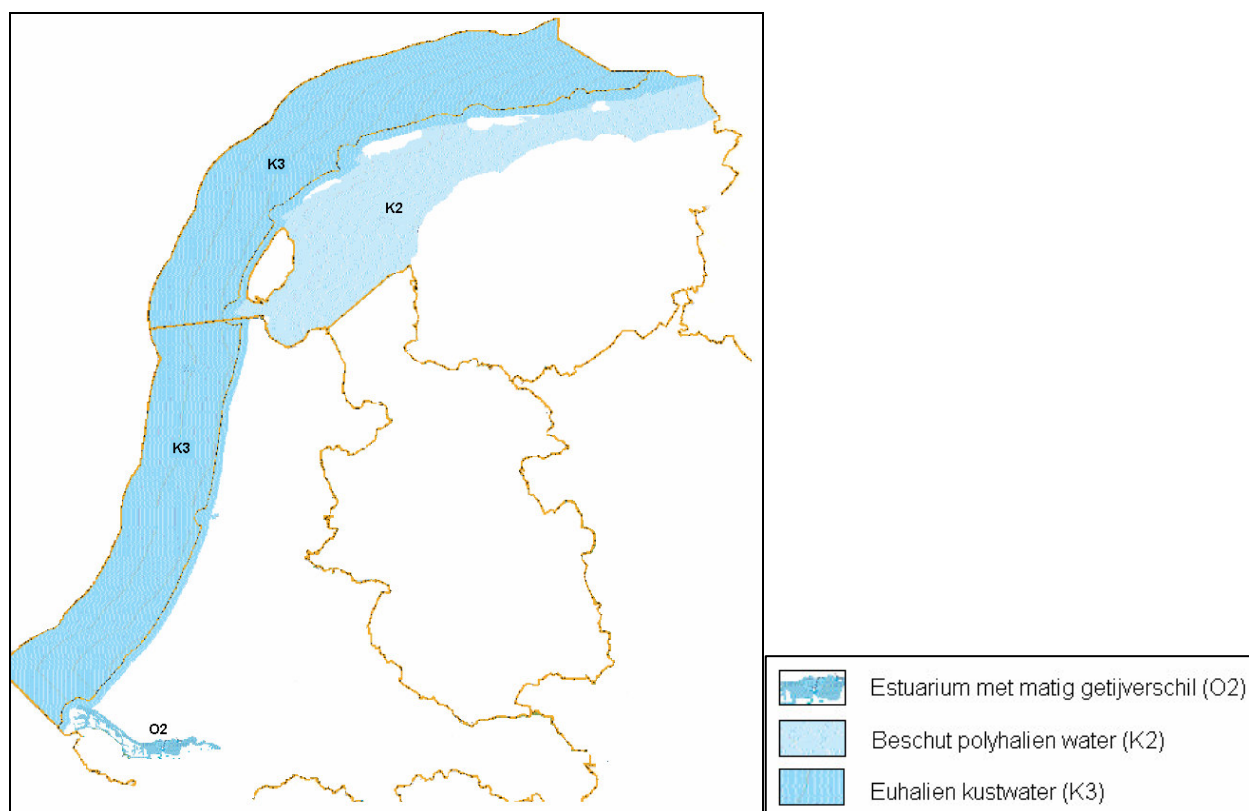
Missing data

The report does not mention the status of the North sea.

Rhine Delta

Name water body	Type	Status
De Nieuwe waterweg	Transitional water O2	Artificial water body
Zuidelijke Noordzee	Coastal water K3	Heavily modified
Noordelijke Noordzee	Coastal water K3	Natural waters
Waddenzee	Coastal water K2	Natural waters

Map of the transitional and coastal water bodies of the river district Rhine delta and the designated types



Literature

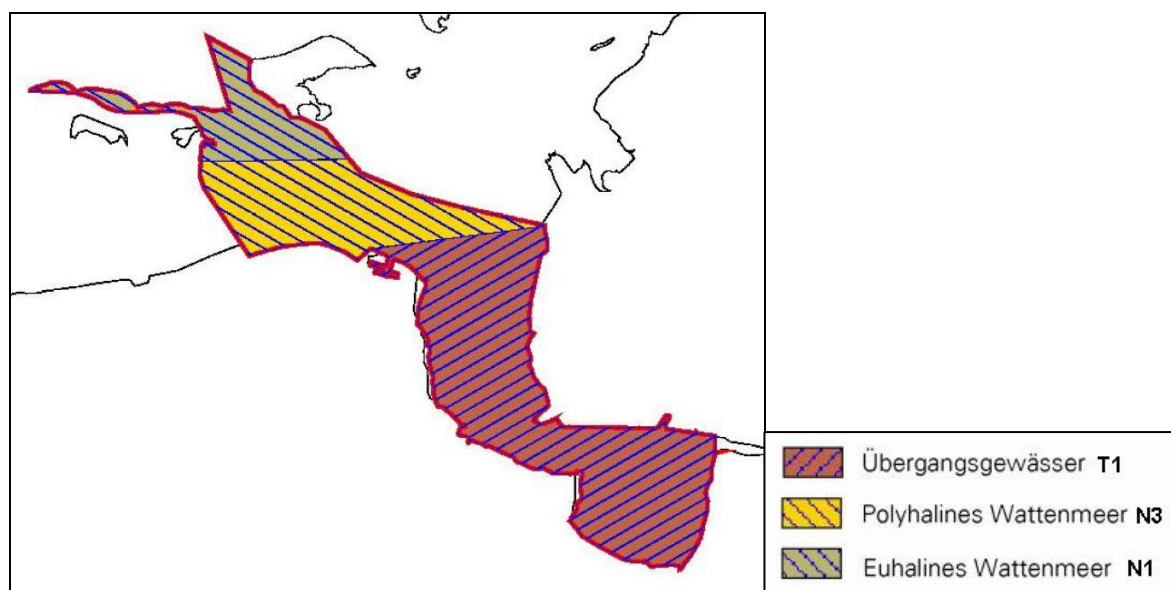
Ministerie van verkeer en waterstaat, 2004. Karakterisering werkgebied Rijndelta, rapportage volgens artikel 5 van de Kaderrichtlijn water (2000/60/EG). December 2004.

Germany

Ems-Dollard

Name water body	Type	Status
Overgangs water Ems	Transitional water T1	Heavily modified
Ems-pilsum until Rottumeroog	Coastal water N3	Natural waters
Rottumeroog until 1 seamile	Coastal water N1	Natural waters

Map of the transitional and coastal water bodies of the Ems-Dollard and the designated types



Literature

Ministerie van verkeer en waterstaat, 2005. Karakterisering Deelstroomgebied Ems-Dollard, Rapportage volgens artikel 5 van de Kaderrichtlijn Water (2000/60/EG). Maart 2005.

Remarks

The status of the coastal waters is not mentioned in the text. In the maps the legends says data of these water bodies is lacking.

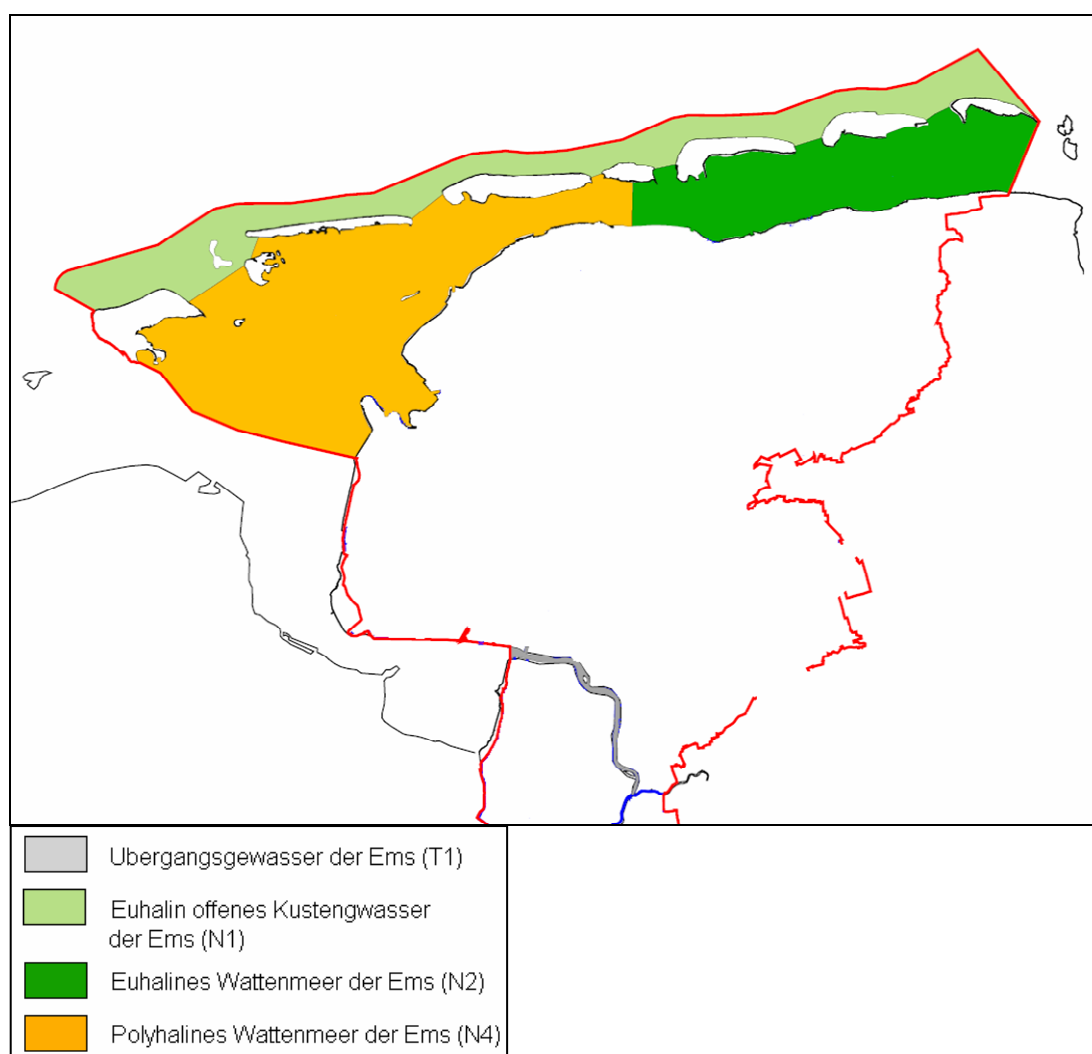
Missing data

Status of the coastal water bodies

Untere Ems

Name water body	Type	Status
Ems (Leer until The Dollard)	Übergangsgewässer der Ems (T1)	Heavily modified
Nordsee	Euhalin offene Küstengewässer der Ems (N1)	
Wattenmeer im osten (Baltrum bis wangeroooge)	Euhalines Wattenmeer der Ems (N2)	
Wattenmeer im westen (Borkum bis Baltrum)	Polyhalines Wattenmeer der Ems (N3)	

Map of the transitional and coastal water bodies of the Untere Ems and the designated types



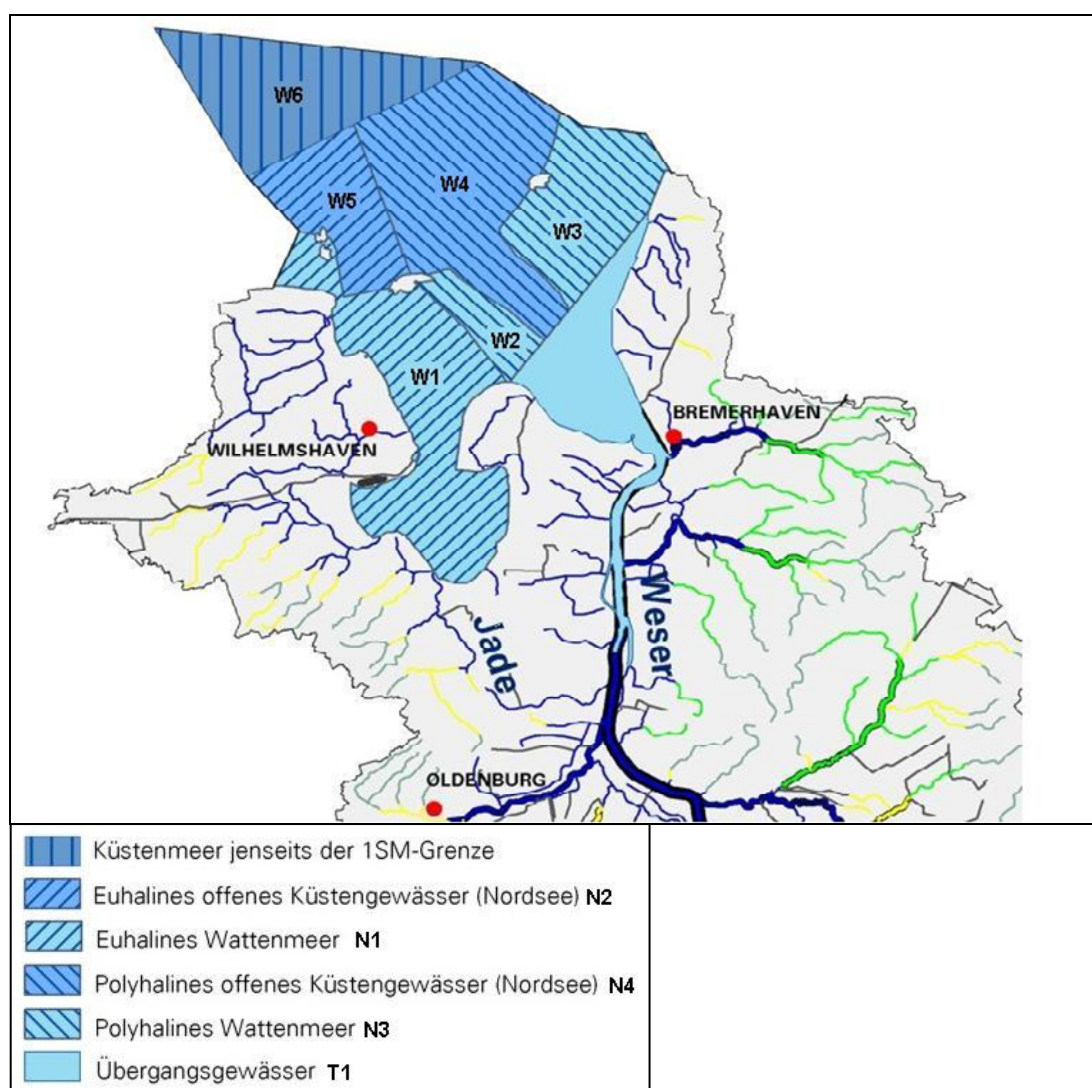
Literature

NLWKN, 2005. B-Bericht Untere Ems 2005, Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz.

Weser

Name water body	Type	Status
Übergangswasser Weser	Transitional water T1	Heavily modified
W1	Coastal water N1	Natural water
W2	Coastal water N3	Natural water
W3	Coastal water N3	Natural water
W4	Coastal water N4	Natural water
W5	Coastal water N2	Natural water
W6	Coastal water	Natural water

Map of the transitional and coastal water bodies of the river district Weser and the designated types



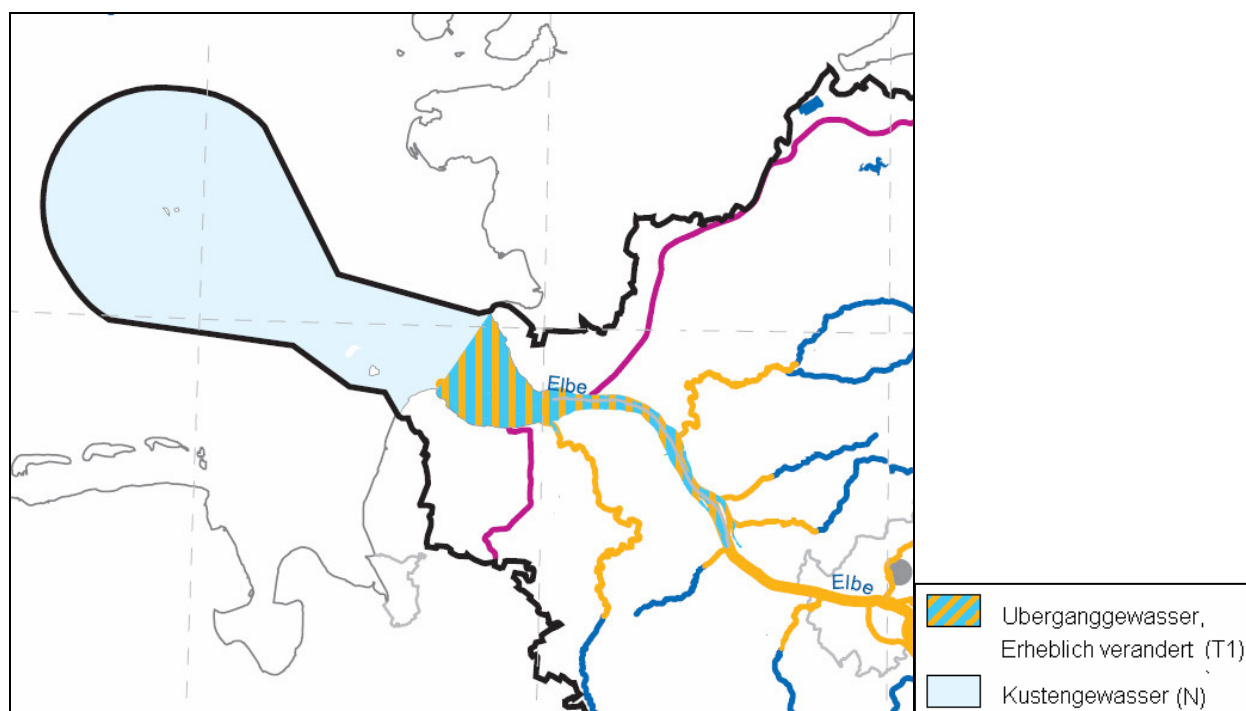
Literature

FGG Weser, 2005. Bewirtschaftungsplan Flussgebietseinheit Weser. EG wasserrahmenrichtlinie. Flussgebiedsgemeinschaft Weser, 2005.

Elbe

Name water body	Type	Status
Übergangswasser Elbe	Transitional water T1	Heavily modified
1	Coastal water N3	Natural
2	Coastal water N4	Natural
3	Coastal water N4	Natural
4	Coastal water N5	Natural

Map of the transitional and coastal water bodies of the river district Elbe and the designated types



Literature

IKSE, 2005. Merkmale der Flussgebietseinheit, Überprüfung der umweltauswirkungen menschlicher tätigkeiten und wirtschaftliche analyse der wassernutzung. Internationale Kommission zum Schutz der Elbe. Maart 2005

Remarks

It is known that there have been addressed 4 coastal water bodies in the Elbe district. The names of the 4 coastal water bodies are not mentioned in the document, therefore they have been numbered 1 to 4 in the table.

On the map these coastal water bodies are visible either.

Missing data

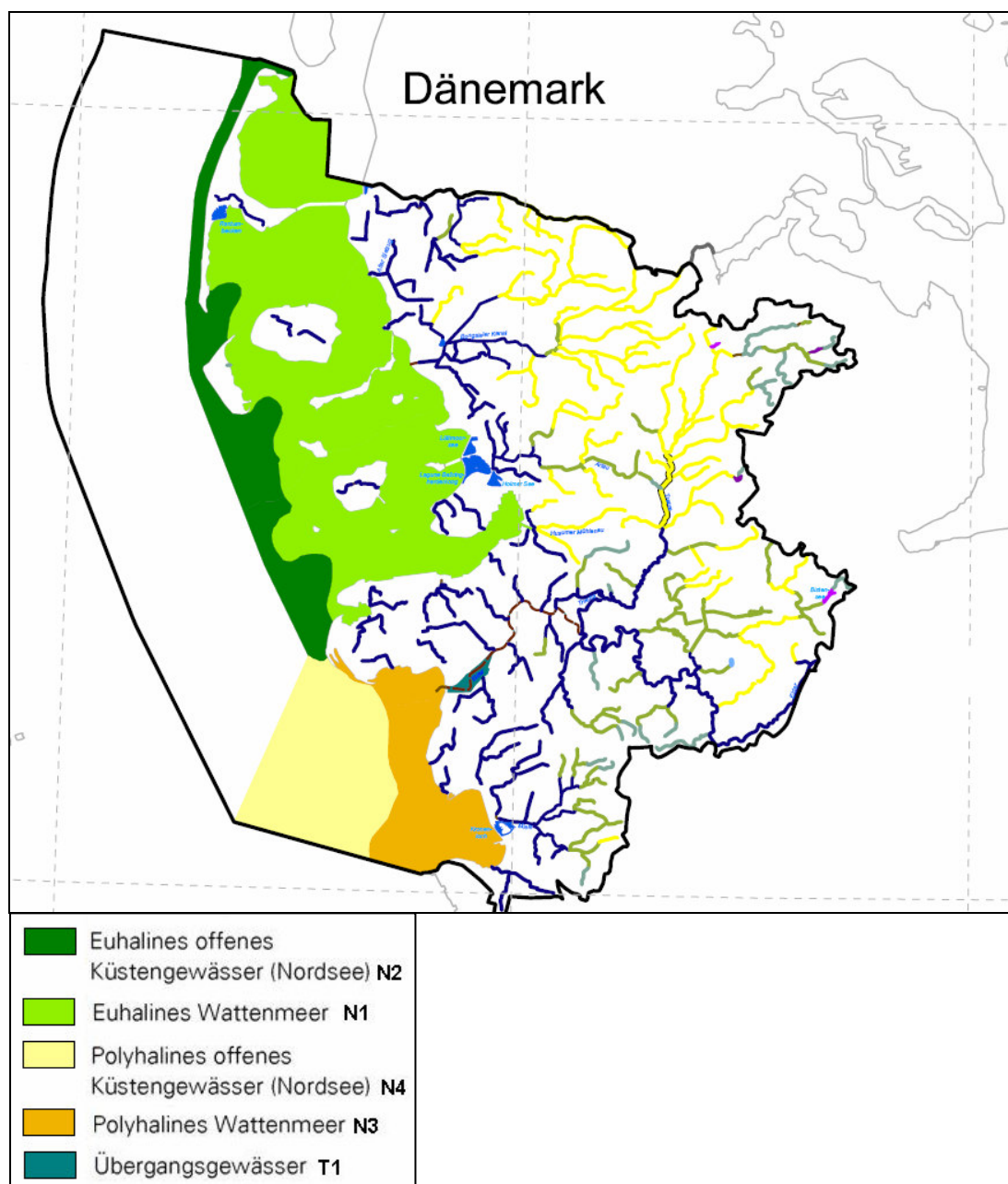
Names of the coastal water bodies.

Map with the borders of the coastal water bodies.

Eider

Name water body	Type	Status
Tide Eider	Transitional water T1	Heavily modified water body
1, 2	Coastal water N1	Natural water
3, 4, 5, 6	Coastal water N2	Natural water
7, 8	Coastal water N3	Natural water
9, 10	Coastal water N4	Natural water

Map of the transitional and coastal water bodies of the river district Eider and the designated types



Literature

Ministerium für Umwelt, Naturschutz und Landwirtschaft des Landes Schleswig-Holstein. 2004. Flussgebietseinheit Eider, Bericht über die Analysen nach Artikel 5 der Richtlinie 2000/60/EG. Dezember 2004.

Remarks

It is known that there have been addressed 10 coastal water bodies in the Eider district. The names of the 10 coastal water bodies are not mentioned in the document, therefore they have been numbered 1 to 10 in the table.

On the map these coastal water bodies are visible either.

Missing data

Names of the coastal water bodies.

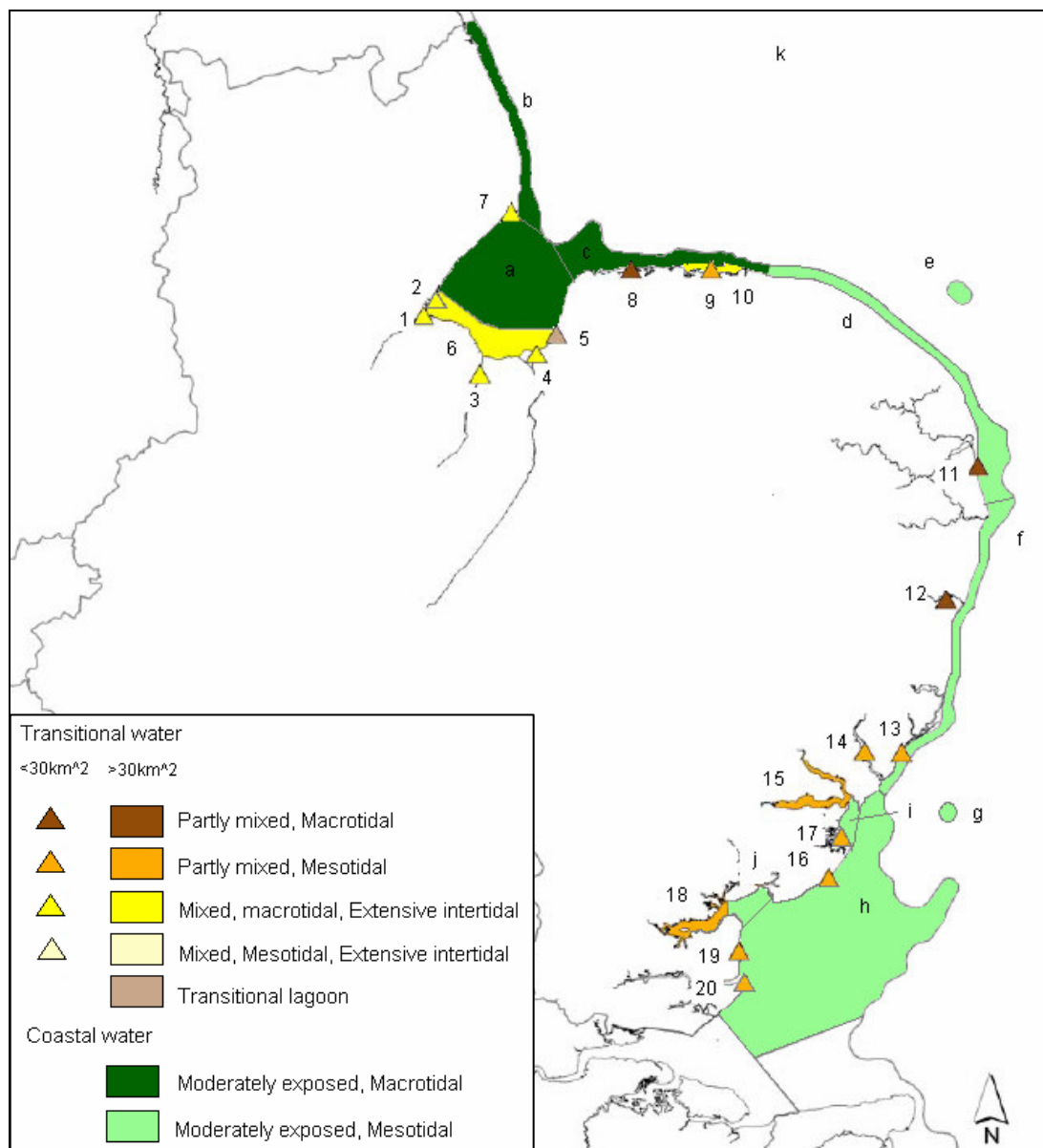
Map with the borders of the coastal water bodies.

United Kingdom

Anglian

Name	type	Status
1, 2, 3, 4, 7	Mixed macrotidal, Extensive intertidal (<30km ²)	Provisionally Heavily modified
5	Transitional lagoon	Provisionally Heavily modified
8, 11, 12	Partly mixed, Macrotidal (<30km ²)	Provisionally Heavily modified
9, 13, 14, 16, 17, 18, 20	Partly mixed, Mesotidal (<30km ²)	Provisionally Heavily modified
6, 10	Mixed macrotidal, Extensive intertidal (>30km ²)	Provisionally Heavily modified
A, b, c	Moderately exposed, Macrotidal	Provisionally Heavily modified
D, e, f, g, h, i, j	Moderately exposed, Mesotidal	Provisionally Heavily modified

Map of the transitional and coastal water bodies of the river district Anglian and the designated types



Literature

Water Framework directive team, 2005. Water framework directive, summary report of the characterization, impacts and economics analyses required by artikel 5, Anglian river basin district. March 2005.

Remarks

In the text it is mentioned that 19 transitional waters and 13 coastal waters have been addressed. On the map however, 20 transitional waters and ten coastal waters are visible.

The names of these water bodies are not mentioned in the document, therefore the water bodies have been numbered in the map.

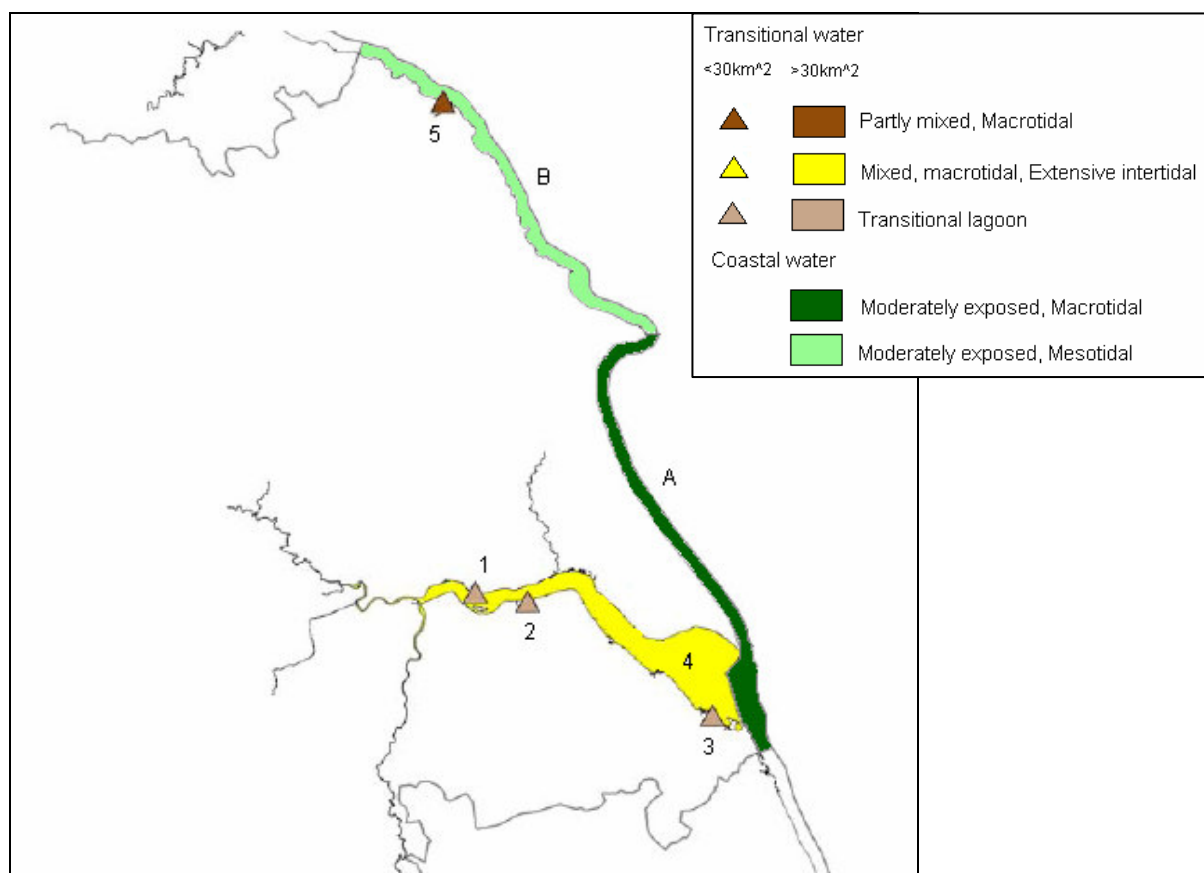
Missing data

Names of the coastal water bodies.

Humber

Name	Type	Status
1, 2, 3	Transitional lagoon (<30km ²)	Provisionally Heavily modified
4	Mixed, macrotidal, extensive intertidal (>30km ²)	Provisionally Heavily modified
5	Partly mixed, macrotidal (<30km ²)	Provisionally Heavily modified
A	Moderately exposed, Macrotidal	Provisionally Heavily modified
B	Moderately exposed, mesotidal	Provisionally Heavily modified

Map of the transitional and coastal water bodies of the river district Humber and the designated types



Literature

Water Framework directive team, 2005. Water framework directive, summary report of the characterization, impacts and economics analyses required by the Article 5 report, Humber river basin district. March 2005.

Remarks

In the text it is mentioned that 5 transitional waters and 1 coastal water have been addressed. On the map however, 5 transitional waters and 2 coastal water are visible. The names of these water bodies are not mentioned in the document, therefore the water bodies have been numbered in the map.

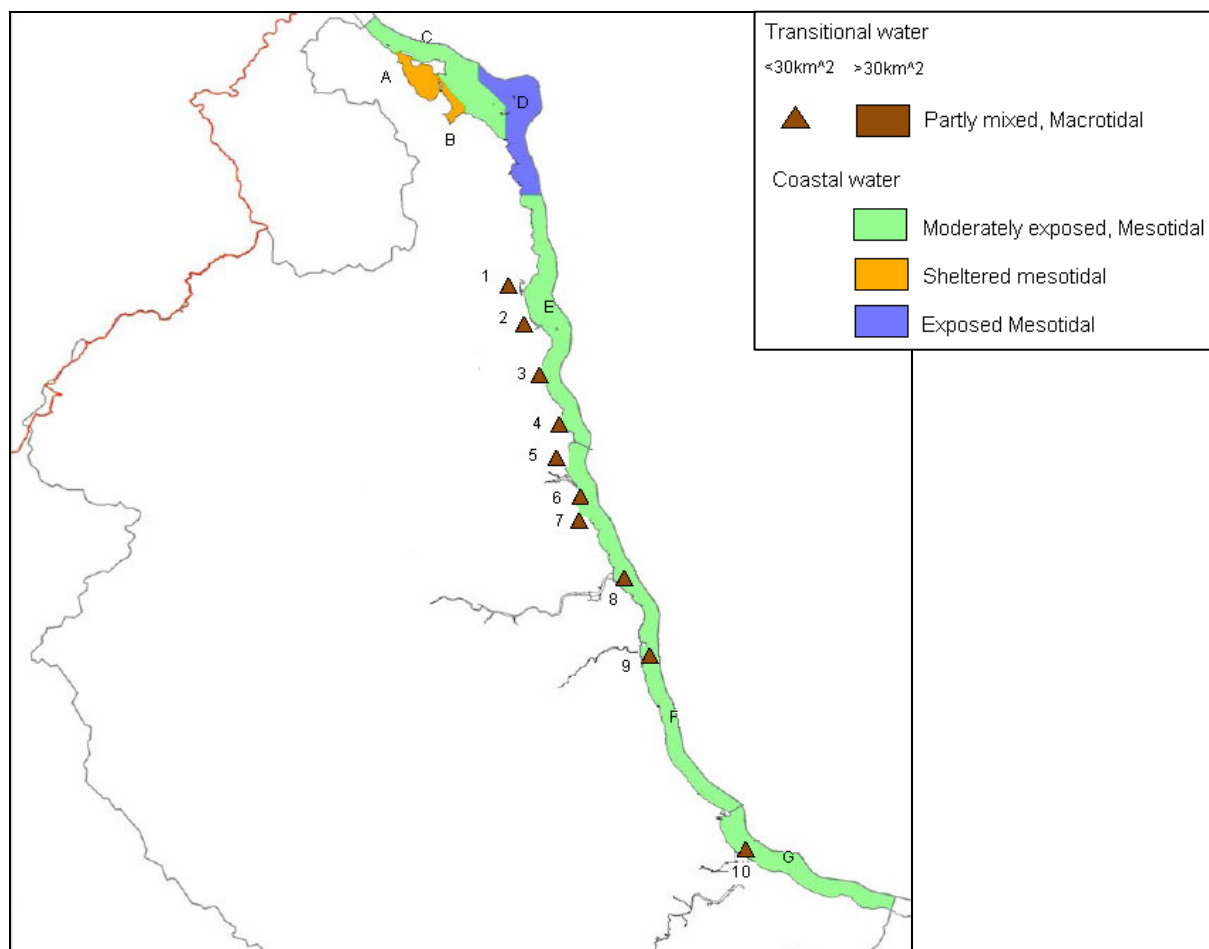
Missing data

Names of the coastal water bodies.

Northumbria

Name	Type	Status
1, 4, 5, 6, 7, 8	Partly mixed, macrotidal (<math><30\text{km}^2</math>)	Provisionally Heavily modified
3		Natural
A, B	Sheltered mesotidal	Provisionally Heavily modified
C, E, G, F	Moderately exposed	Provisionally Heavily modified
D	Exposed mesotidal	Provisionally Heavily modified

Map of the transitional and coastal water bodies of the river district Northumbria and the designated types



Literature

Water Framework directive team, 2005. Water framework directive, summary report of the characterization, impacts and economics analyses required by the article 5 report, Northumbria river basin district. March 2005.

Remarks

In the text it is mentioned that 10 transitional waters and 7 coastal waters have been addressed. On the map however, 8 transitional waters are visible.

The names of these water bodies are not mentioned in the document, therefore the water bodies have been numbered in the map.

Missing data

Names of the coastal water bodies.

Scotland

Water bodies

40 transitional water bodies.

449 coastal water bodies.

Types

4 transitional water types:

- Partly mixed/stratified, mesohaline/polyhaline. Strongly mesotidal, sheltered. Intertidal/shallow sub-tidal, sand and mud.
- Transitional lagoons (Partly mixed/stratified, Oligohaline + polyhaline, sheltered, shallow, mud)
- Transitional sea lochs (Polyhaline, mesotidal, sheltered)
- Fully mixed, polyhaline, Macrotidal, sheltered, extensive intertidal, sand or mud.

9 coastal water types:

- Shallow sea loch.
- Deep sea loch.
- Euhaline, moderately exposed, macrotidal.
- Euhaline, moderately exposed mesotidal.
- Euhaline, moderately exposed, microtidal.
- Lagoon (Euhaline sheltered).
- Euhaline, exposed, mesotidal.
- Euhaline, exposed, microtidal.
- Euhaline, sheltered, mesotidal.

Status

23 transitional water bodies: heavily modified.

17 transitional water bodies: natural.

128 coastal water bodies: heavily modified.

321 coastal water bodies: natural.

Literature

Sepa, 2005. Scotland river Basin District, characterization and impact analyses required by article 5 of the Water Framework Directive, Summary report. Scottish Environment Protection agency.

Remarks

The names of the water bodies are not mentioned in the text.

The maps in the annexes of the document are very vague and the different water bodies are not visible. Therefore it is not possible to make a connection between the waterbodies, the types and the status.

Missing data

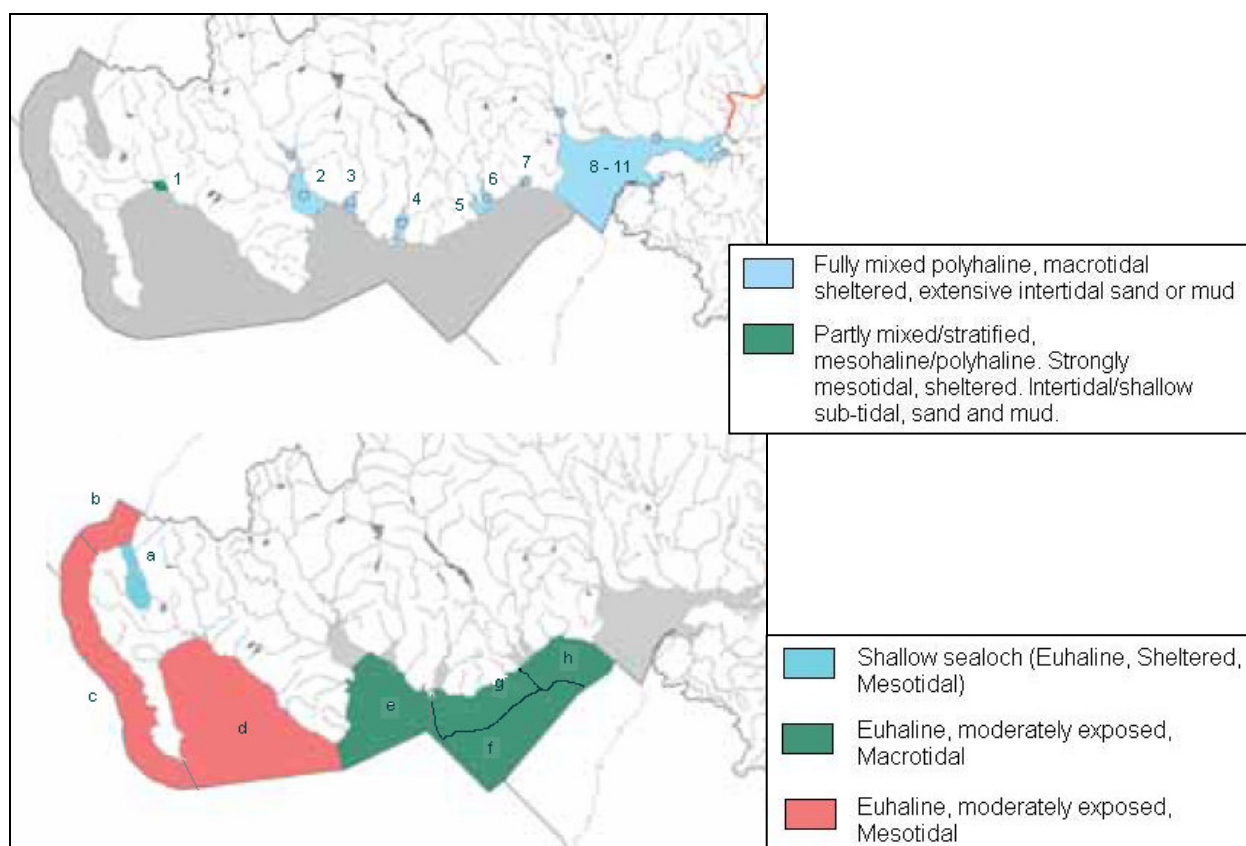
Names of the water bodies.

Clear maps of the water bodies.

Solway Tweed

Name	Type	Status
1	Fully mixed polyhaline, macrotidal sheltered, extensive intertidal sand or mud	Heavily modified
2 - 7	Partly mixed/stratified, mesohaline/polyhaline. Strongly mesotidal, sheltered. Intertidal/shallow sub-tidal, sand and mud.	Natural
8 - 11	Partly mixed/stratified, mesohaline/polyhaline. Strongly mesotidal, sheltered. Intertidal/shallow sub-tidal, sand and mud.	Heavily modified
A	Shallow sea loch (Euhaline, Sheltered, Mesotidal)	Heavily modified
B, C, D, E	Euhaline, moderately exposed, Macrotidal	Natural
F, G	Euhaline, moderately exposed, Mesotidal	Natural
H	Euhaline, moderately exposed, Mesotidal	Heavily modified

Map of the transitional and coastal water bodies of the river district Solway tweed and the designated types



Literature

Sepa, 2005. Solway Tweed River Basin District, characterization and impact analyses required by article 5 of the Water Framework Directive, Summary report. Scottish Environment Protection agency.

Remarks

In the text it is mentioned that 11 transitional waters and 8 coastal water have been addressed. The maps however are of pore quality and the borders of the transitional are not visible.

The names of these water bodies are not mentioned in the document, therefore the water bodies have been numbered in the map (as good as possible).

Missing data

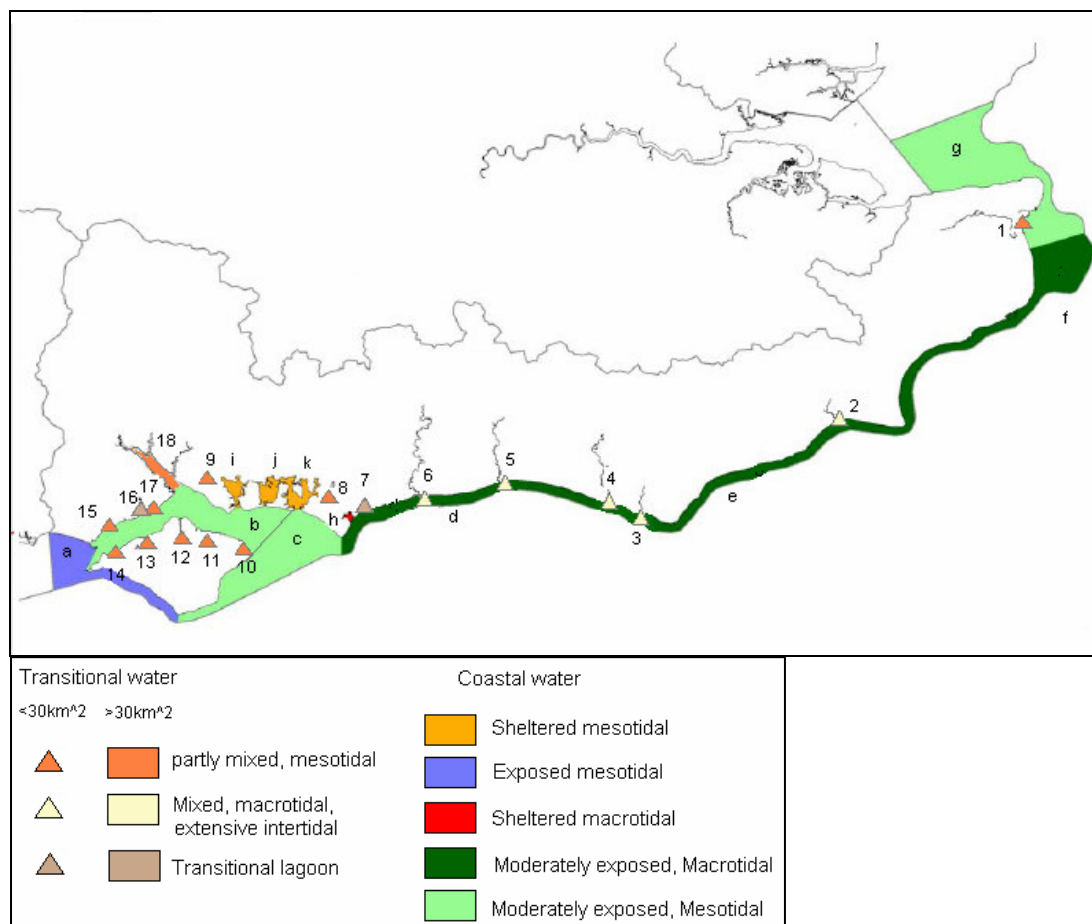
Names of the coastal water bodies.

Clear maps.

South east

Name	Type	Status
1, 8, 9, 10, 11, 12, 13, 14, 15, 17	Partly mixed mesotidal <30 km ²	Provisionally heavily modified
18	Partly mixed mesotidal >30 km ²	Provisionally heavily modified
2, 3, 4, 5, 6	Mixed macrotidal, extensive intertidal <30 km ²	Provisionally heavily modified
7, 16	Transitional lagoon <30 km ²	Provisionally heavily modified
a	Exposed mesotidal	Natural
B, c, g	Moderately exposed, mesotidal	Provisionally heavily modified
D, e, f	Moderately exposed, macrotidal	Provisionally heavily modified
h	Sheltered macrotidal	Provisionally heavily modified
i, j, k	Sheltered mesotidal	Provisionally heavily modified

Map of the transitional and coastal water bodies of the river district South East and the designated types



Literature

Water Framework directive team, 2005. Water framework directive, summary report of the characterization, impacts and economics analyses required by the Article 5 report, South east river basin district. March 2005

Remarks

In the text it is mentioned that 20 transitional waters and 15 coastal waters have been addressed. On the map however only 18 transitional waters and 11 coastal waters are visible.

The names of these water bodies are not mentioned in the document, therefore the water bodies have been numbered in the map.

Missing data

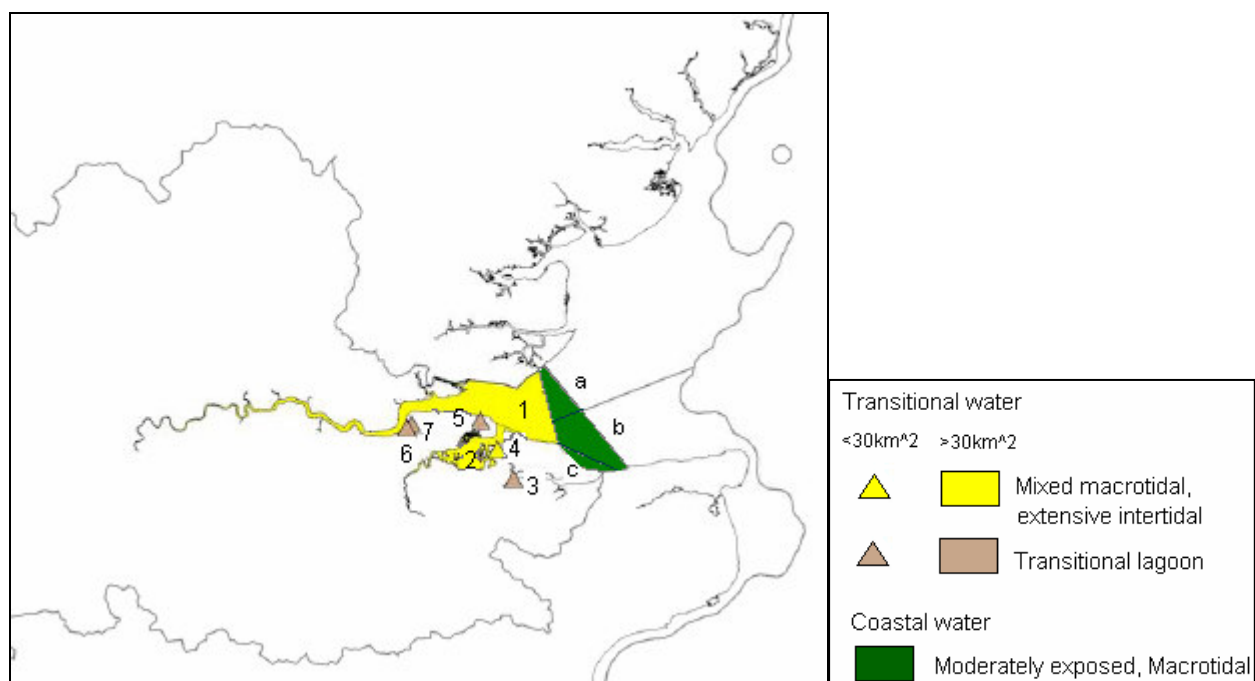
Names of the coastal water bodies.

Clear maps.

Thames

Name	Type	Status
1	Mixed macrotidal, extensive intertidal > 30km ²	Provisionally heavily modified
2	Mixed macrotidal, extensive intertidal > 30km ²	Provisionally heavily modified
3, 5, 6, 7	Transitional lagoon < 30km ²	Provisionally heavily modified
4	Mixed macrotidal, extensive intertidal < 30km ²	Provisionally heavily modified
A, b, c	Moderately exposed, macrotidal	Provisionally heavily modified

Map of the transitional and coastal water bodies of the river district Thames and the designated types



Literature

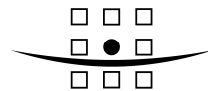
Water Framework directive team, 2005. Water framework directive, summary report of the characterization, impacts and economics analyses required by the Artikel 5 report, Thames river basin district. March 2005

Remarks

The names of these water bodies are not mentioned in the document, therefore the water bodies have been numbered in the map.

Missing data

Names of the coastal water bodies.
Clear maps.



ROYAL HASKONING

Annex 5

Methods reference conditions

Belgium

The arrangement of a historical reference as well as a special reference for transitional waters is not possible anymore. Human activities go to far back in time and are too widespread. The reference conditions are therefore defined from an analyses of existing knowledge from the functioning of the system.

As a reference for the coastal area 'het Zwin' the definition for coastal waters will be used: 'An area where sandy, dynamic coast dunes and sheltered-intertidal (and therefore silt rich) each other meet. This means that a natural reference situation an area is which is rich in contact habitats between natural landscape elements, through which ecological gradients can exist. An important difference with transitional waters is that the supply of fresh water is only provided by seepage from the nearby infiltration areas, the coastal dunes and the sea dikes.

Indicator	Parameter	Referentie
Phytoplankton	Trophy grade (incl. Silicium)	For the Flemish transitional waters an ecological reference situation can be described as a description of the maximum scores for each variable or metric which is important for the defining of the EQR of that type.
	Light climat	
	Danger of flushing out	
Angiosperms	For the Scheldt, the presence of fresh and brackish water mud flat vegetation.	List of al possible communities of salt marsh and mud flat vegetation in transitional and coastal waters.
	For the IJzer estuary, the presence of fresh water mud flat vegetation.	
Benthos	Presence of sensitive filterfeeders: Salt water: de Kokkel en het Nonnetje Brackish water: <i>Pisidium casertanum</i> Freh water: <i>Pisidium amnicum</i> , <i>Pisidium supinumum</i>	List of all possible species which could be present in transitional and coastal waters.
Fishfauna	Number of species	Fishindex for the Scheldt
	Indicator	
	%bot & spiering	
	Tolerance value	
	Simpson diversity index D (1- λ)	
	Number of estuarine residence species.	
	Number of diadrome species	
	% marine juvenile migrating species	
Number of benthic species		
Tidal regime	Average high water	Measurement data of the last 100 tot 120 year.
	Average low water	
	Average tidal reach	
Morphological circumstances	Meandering patroon (sinuosity)	Historical sinuosity
	Shore structure	The formula for the assessment of the structure of tidal rivers by Hoffmann et al. (1997).

Indicator	Parameter	Referentie
Physical-Chemical circumstances	Guidelines for high ecological potential (Loose et al., 1995).	Guideline for high ecological quality (De Loose et al., 1995)
	N	The values from 'Inventarisatie en typologie van ecologisch waardevolle waterlopen in het Vlaamse gewest'
	P	
	Oxigen balans	The values from the CUWVO-rapport (CUWVO, 1988).
	Temperature	
Tranparancy		
Specific synthetic hazardous substances.	Concentrations of all specific hazardous substances from the annexes of the WFD.	List of priority substances and the most important hazardous substances from the WFD,
Specific non-synthetic hazardous substances.	The Dutch national background values. (for the present).	Background values from the WFD.

Literature

Artikel 60 rapport (Artikel 5 KRLW) SDG Schelde – Maart 2005

Netherlands

The quantifying of the reference condition has been based on a combination of historical data, descriptions of undisturbed situations in the Netherlands and other countries, model results and expert knowledge. The method is in consensus with the REFCOND Guidance, 2003 and the Guidance on Ecological Classification, 2003).

No significant date has been chosen, when historical data was used. Because the reference has not been fixed temporarily is extra attention given to the tuning between the biological quality elements and between biology, hydromorphology and chemistry. For the description of the global references a link has been made with the description of the Natuurdoeltypen (Bal *et al.*, 2001).

Parameter	Parameter	Reference
Phytoplankton	Chlorofyl a	Historical data and model results
	<i>Phaeocystis</i>	Historical data and model results
Angiosperms	Mud flats and salt marshes (quantity).	Situation 1000 na Chr. (voor de Ems-Dollard zijn geen gegevens beschikbaar)
	Mud flats and salt marshes (quality).	Expert judgement
	Seagrass (quantity)	Expert judgement
	Seagrass (quality)	Present situation and expert judgement
	Seaweed soft substrate	Available historical data
Macrofauna	Macrobenthos species	List of species for macrofauna. Composed with international data and expert judgement.
	Biomass on watersystem level	Biomass (gram Ash free dry weight per m ²) = - 1,5 + 0,105 * Primary production (gram C per m ² per year).
	Species composition per ecotype	Biotische coëfficiënt per ecotype (Borja et al., 2000)
Fish	Number of diadrome species	Reference list of species composed with historical description for Ems-Dollard and Wester-Scheldt.
	Number of estuarine residence species	
	Number of nursery species	
	Number of species seasonal gasts	
	Fint	
Physical chemical circumstances	Termal circumstances	Values from Bal et al. (2001) completed with other sources and expert-judgement.
	Oxigen balance	
	Salt concentration	
	Nutrients	
	Transparency	
Hydromorphology	Discharge fresh water	Several sources and expert judgement
	Average tidal difference	
	Wave height	
	Water depth transitional waters	
	Mineral slib	
	Mineral sand	

Literature

Van der Molen, D. T., Pot, R., 2006. Referenties en maatlatten voor kust- en overgangswateren voor de Kaderrichtlijn Water, Rijkswaterstaat. April 2006
www.stowa.nl

Germany

Because a lot of the water bodies have been identified as heavily modified it is hard to define reference areas.

Therefore Germany will use models, historical data and expert judgement to describe the reference conditions

3 methods:

- The use of reference areas.
- Historische data.
- Modellen en overlegging.

3 thema's:

- Hydromorphological.
- Biological.
- Physical – chemical.

The reference areas have been selected on their water morphology, water quality, water transport and aquatic communities. The reference areas must have a high natural level.

United Kingdom

The reference conditions are based on the Eunis classification and should therefore be read in conjunction with TAG WP2a(02) Marine Typology Final (P2 v12 14-4-04).

General descriptions are provided for 6 transitional and 11 coastal types covering the UK and contain:

- Type Overview description
- Reference Condition Quality Elements description/s.

Reference conditions have been developed by the MTT's working groups for the biological quality elements. The descriptions are necessarily qualitative at this TAG Work Programme 8a (03).

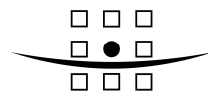
Parameter	Parameter	Referentie
Fytoplankton	Pelagic water column	Eunis classification
Angiospermen	Seagrass beds on littoral and sublittoral sediments	
	Salt marsh	
Macroalgae	Littoral rock, sub-littoral rock and other hard substrate.	
	Littoral sediment, sub-littoral sediment	
Benthic macro-invertebrates	Sand shores	
	Sub-littoral fine sands	
	Littoral rock very exposed to wave action	
	Animal communities in fully marine shallow-water muddy sands	
	Moderately exposed circa littoral rock	
Fysico chemical characteristics	Temperature	
	Dissolved oxygen	
	Nutrients	
	Transparency	
Hydromorphology	Discharge fresh water	
	Average tidal difference	
	Wave height	
	Water depth transitional water	
	Mineral slib	
	Mineral sand	

MTT, 2004. TAG 2004 WP8a(03) reference conditions for transitional and coastal waters.

http://www.wfduk.org/tag_guidance/Article_05/Type%20specific%20reference%20conditions/TAGWorkProgramme8a%2803%29Reference%20conditions%20for%20TRAC

Denmark

The reference conditions are not defined yet, but an existing system is used until the intercalibration process is finished and the reference conditions are fixed.



ROYAL HASKONING

Annex 6 National legislation

Overview of the national legislation or policy regarding the WFD for the member states.

Country	Legislation/policy
Belgium	Het decreet betreffende het integraal waterbeleid (decreet IWB) van 18 juli 2003 (BS 14 november 2003)
Germany	Wasserhaushaltsgesetz (WHG) Landeswassergesetzen
The Netherlands	Wet op de Waterhuishouding Wet milieubeheer
United Kingdom	The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 The Water Environment (Water Framework Directive) (Northumbria River Basin District) Regulations 2003 The Water Environment and Water Services (Scotland) Act. 2003
Denmark	Lov om miljømål m.v. for vandforekomster og internationale naturbeskyttelsesområder (miljømålsloven). LOV nr 1150 af 17/12/2003 Rådets direktiv, af 18 . juli 1978. Om kvaliteten af ferskvand , der kræver beskyttelse eller forbedring for at være egnet til , at fisk kan leve deri (78/659/EOEF) Bekendtgørelse om kvalitetskrav for vandområder og krav til udledning af visse farlige stoffer til vandløb, søer eller havet (* 1). BEK nr 921 af 08/10/1996 Europa- parlamentets og rådets direktiv 2006/11/EF af 15. februar 2006