EUROPEAN
COMMISSION

Brussels, 14.11.2012
SWD(2012) 379 final

26/30

COMMISSION STAFF WORKING DOCUMENT

Member State : Sweden

Accompanying the document

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

on the Implementation of the Water Framework Directive (2000/60/EC)

River Basin Management Plans

{COM(2012) 670 final}

1. GENERAL INFORMATION

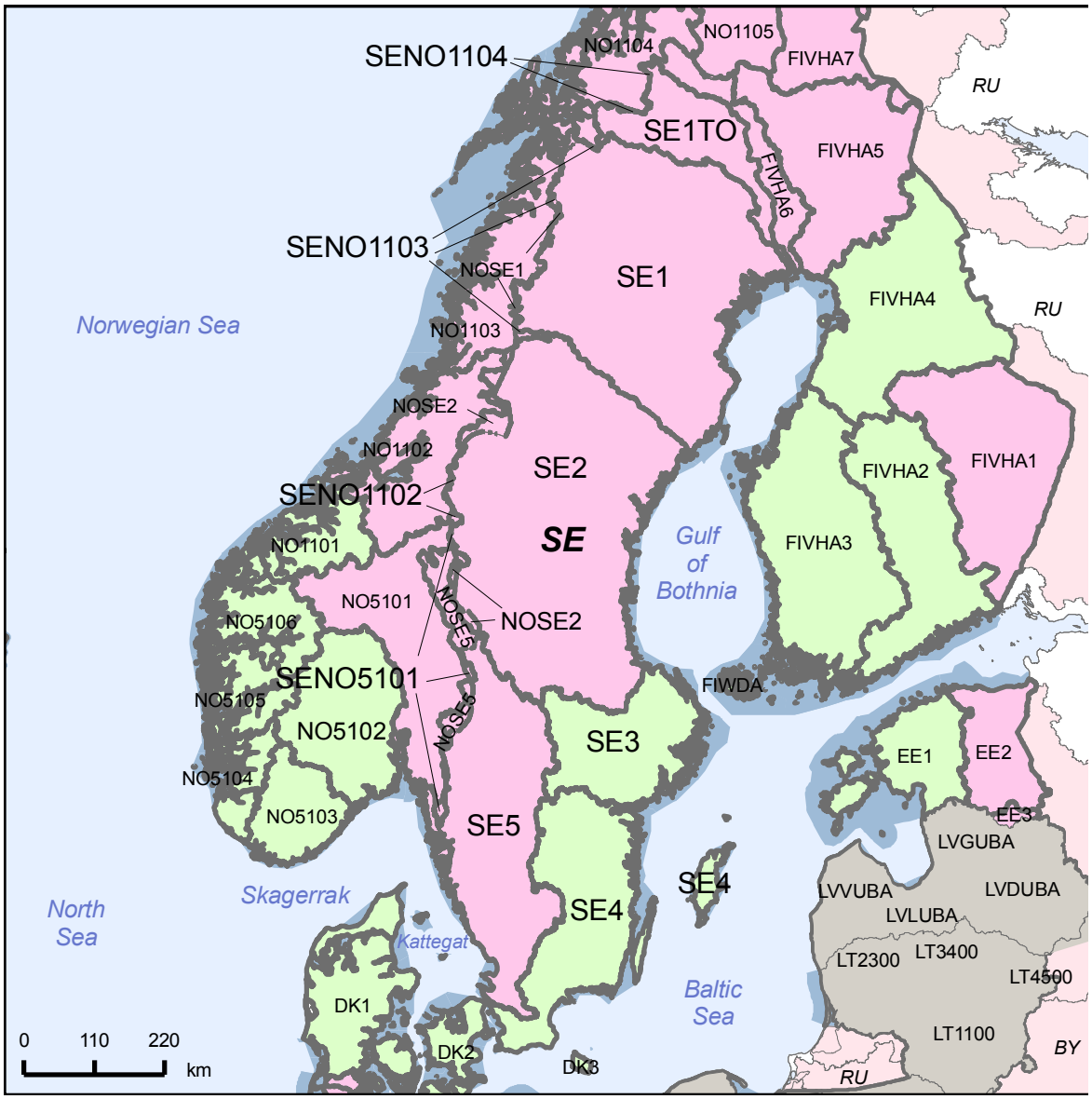


Figure 1.1: *Map of River Basin District*

International River Basin Districts (within EU)
International River Basin Districts (outside EU)
National River Basin Districts (within EU)
Countries (outside EU)
Coastal Waters

Source: *WISE, Eurostat (country borders)*

The Swedish population is 9.42 million (Eurostat 2011[1]). The total area of Sweden is 453 140 km^2 ([2]) SE 1 is shared with Finland and Norway mainly by the River Torne, which forms part of the border between Finland and Sweden This catchment also has a very small part in Norway.

The border between Sweden and Norway is mostly formed by a mountain range. About 30 transboundary rivers are shared between the two countries, most of them having only a small part in the upstream country. These small parts of catchments have been given specific codes in addition to the main RBDs in Sweden (SE1, SE2 and SE5). In SE5 there is one major international river shared with Norway, the Göta river catchment, which includes Lake Vänern, EU's largest lake (5655km²).

For these smaller RBDs no separate plans have been developed, but the areas are covered by the main RBMPs.

RBD	Name	Size[3] (km^2) (Area including coastal waters shown in brackets)	Countries sharing RBD
SE1**	Bothnian Bay RBD (Bottenviken)	147000 (155000)	FI, NO
SE1TO	Torne river (managed as part of SE1)		FI
SENO1104	Troms (managed as part of SE1)		NO
SENO1103	Nordland (managed as part of SE1)		NO
SENO1102	Troendelag (managed as part of SE2)		NO
SE2**	Bothnian Sea RBD (Bottenhavet)	141000 (147000)	NO
SE3**	North Baltic RBD (Norra Östersjön)	37000 (44000)	-
SE4**	South Baltic RBD (Södra Östersjön)	54000 (65000)	-
SE5**	Skagerrak and Kattegat RBD (Västerhavet)	69000 (73000)	NO
SENO5101	Glomma (managed as part of SE2 and SE5)		NO

Table 1.1: *Overview of Sweden's River Basin Districts*
Note: *** Main RBDs shown. All the small international parts of these RBDs are reported in separate envelopes in CDR (http://cdr.eionet.europa.eu/se/eu/wfdart13), but the RBMPs are the same as those for the main RBDs, and are adopted and reported at the same dates.*
Source: *River Basin Management Plans reported to WISE[4]: http://cdr.eionet.europa.eu/se/eu/wfdart13*

1 http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&language=en&pcode=tps00001&tableSelection=1&footnotes=yes&labeling=labels&plugin=1

2 Map and area from European Commission 2nd implementation report on WFD monitoring of 2009, Annex http://ec.europa.eu/environment/water/water-framework/implrep2007/index_en.htm

3 Source: http://www.vattenmyndigheterna.se/Sv/om-vattenmyndigheterna/fakta-om-distrikten/Pages/default.aspx?keyword=Vattendistrikt+areal

4 This MS Annex reflects the information reported by the MS to WISE which may have been updated since the adoption of the RBMPs. For this reason there may be some discrepancies between the information reported in the RBMPs and WISE.

The international river basin districts shared with Finland and Norway are not jointly designated, although it is understood the processes are on-going. In some RBDs there are several trans-boundary river basins. The on-going close co-operation with Norway leads to category 2 co-operation status, and it is recognised that delays are due to the later timetable for WFD implementation in Norway.

Name international river basin	SE RBDs	Countries sharing RBD	Co-ordination Category	
			2	
			km^2	%
Ångermanälven	SE2	NO	30349	95.0
Dalälven	SE2	NO	27843	95.0
Fagerbakkvassdraget	Nordland/SE1	NO	20	2.0
Glomma	Glomma/SE5/SE2	NO	430	1.0
Haldenvassdraget/Enningsdal	SE1	NO	578	23.0
Hellemovassdraget	Nordland/SE1	NO	16	1.0
Indalsälven	SE2	NO	24763	92.0
Klarälven/Trysil - Göta alv/Vänern Göta/ (including the Sub-basins Norsälven/Byälven/ Upperudälven)	SE5	NO	42982	84.0
Kobbelva	Nordland/SE1	NO	10	1.0
Luleälven	SE1	NO	24506	97.0
Malselvvassdraget/Malangen	Troms/SE1	NO	209	3.0
Nidelva	Troendelag/SE2	NO	293	8.0
Piteälven	SE1	NO	11186	99.0
Ranavassdraget	Nordland/SE1	NO	270	6.0
Rossaga	Nordland/SE1	NO	193	7.0
Saltelva	Nordland/SE1	NO	119	6.0
Signaldalselva	Troms/SE1	NO	46	3.0
Skjomavassdraget	Nordland/SE1	NO	160	10.0
Stjordalsvassdraget	Troendelag/SE2	NO	46	2.0
Torneälven/Tornionjoki	SE1	FI/NO	25393	63.1
Umeälven	SE1	NO	26561	99.0
Vefsna	Nordland/SE1	NO	548	12.0
Verdalsvassdraget	Troendelag/SE2	NO	102	6.0

Table 1.2: *Transboundary river basins by category (see CSWD section 8.1) and % share in Sweden*[5]
Category 1: Co-operation agreement, co-operation body, RBMP in place.
Category 2: Co-operation agreement, co-operation body in place.
Category 3: Co-operation agreement in place.
Category 4: No co-operation formalised.
Source: *EC Comparative study of pressures and measures in the major river basin management plans in the EU.*

[5] Categorisation determined under the EC Comparative study of pressures and measures in the major river basin management plans in the EU (Task 1b: International co-ordination mechanisms).

2. STATUS OF RIVER BASIN MANAGEMENT PLAN REPORTING AND COMPLIANCE

RBMPs were adopted on 15-18 December 2009 and reported to the Commission on 19.3.2010.

2.1 Main strengths

Fairly good common structure of the RBMPs linked closely to the WFD requirements. The Swedish RBMPs are also transparent in some respects, with water body specific information on objectives and exemptions, and which competent authorities are responsible for measures. Although the RBMPs to a large extent lack information on the final measures, Sweden has been transparent in highlighting shortcomings and identifying where there is a need for further investigations, to ensure that the next cycle of RBMPs are complete.

Where WFD compliant assessment system have been developed for BQEs and other QEs (but see 2.2 below), class boundaries are compliant with the IC Official Decision.

2.2 Main shortcomings

A number of shortcomings in the Swedish monitoring programmes have been identified. It is also recognised by Sweden in the RBMPs that the monitoring programmes are insufficient, and that monitoring networks are to be improved for the second cycle. The Commission considers these shortcomings serious. They were already identified in 2009 in the Commission's 2nd WFD implementation report. The monitoring networks are therefore considered incomplete in this first cycle. This is particularly serious since it also has repercussions on all other parts of the RBMPs, including classification, the setting of specific objectives and the identification of measures.

Not all relevant biological quality elements are being monitored, and it appears that biological monitoring takes place in very few water bodies. Of the supporting elements, hydromorphological quality elements are not monitored at all and the physico-chemical quality elements are only monitored in some places. The justifications for not monitoring certain quality elements are also not always adequate.

The information on identification and monitoring of priority substances and other pollutants is not clear in the RBMPs, and based on the information assessed, the monitoring is not compliant with WFD requirements. Swedish Authorities have clarified that information on monitoring of priority substances was not included due to the late adoption of the EQS Directive. This is not in line with the WFD, since monitoring requirements are not linked to the adoption of EQS for these substances.

The programme of measures lack information on the specific measures to be taken to achieve the environmental objectives. This is a concern not just for transparency of the plans with regard to public interest and economic actors, but also towards the authorities tasked to carry out the measures.

3. GOVERNANCE

3.1 Timeline of implementation

The Swedish RBMPs and the accompanying documents were submitted on 19 March 2010 with two minor resubmissions confirmed on 22 April 2010 and 7 June 2011.

The dates for submission and resubmissions are the same for all 5 large RBD. The corresponding main RBMPs for the 5 smaller international RBD.

Sweden has taken a national approach for the different consultations as required by Article 14 of the WFD, so the dates for the consultations are the same all over the country.

RBD	Timetable	Work programme	Statement on consultation	Significant water management issues	Draft RBMP	Final RBMP
Due dates	**22/06/2006**	**22/06/2006**	**22/06/2006**	**22/12/2007**	**22/12/2008**	**22/12/2009**
All SE RBDs	01/02/2007 to 01/08/2007	01/02/2007 to 01/08/2007	01/02/2007 to 01/08/2007	01/02/2008 to 01/08/2008	01/03/2009 to 01/09/2009	15-18/12/2009

Table 3.1.1: *Timeline of the different steps of the implementation process*
Source: *WISE*

3.2 Administrative arrangements - river basin districts and competent authorities

The competent authority for the development of the RBMPs, including the PoM, is the Water Authority (Vattenmyndigheterna), which is hosted by one of the regional authorities in the RBD.

The Water Authorities decide on environmental quality standards, PoM and RBMPs. A range of government agencies and municipalities are responsible for identifying and implementing the measures proposed in the PoMs.

There is a national approach to water management in Sweden. The national approach is supported by the substantial number of national documents available for the Water Authorities e.g. documents on regulation, guidelines etc., and that the measures taken in the different RBD are picked from a national catalogue of 38 measures. There are also clear differences between the 5 RBMPs, including the PoMs, reflecting differences in soil type, demography, pressures (e.g. agriculture mainly in the southern part, forestry and hydro power production mainly in the northern part).

After the adoption of the RBMPs, the administrative set-up has changed with the adoption of a new national authority for marine and inland waters (Havs och Vattenmyndigheten).

3.3 RBMPs - Structure, completeness, legal status

For each of the five main River Basin Districts, the following main documents were reported:

- a river basin management plan,
- a programme of measures,
- a document with the environmental objectives,
- an environmental impact assessment,
- one note with the record of public consultation.

Accompanying the RBMP documents, a substantial number of supplementary documents (in all 58) were submitted on the national level covering e.g. regulation (laws, order etc.), guidelines and reports.

In general the RBMP including the PoM is well structured and easy to overview and has the same format as the 5 RBDs. It contains the necessary information according to the WFD annex VII.

At least some of the RBMPs have been supported by "sub-plans" describing specific individual basins or parts of basins. These sub-plans are supporting documents – not legally binding, but detailing the information in the RBMP and important or necessary to understand the status, need for improvement and the measures to be taken on a smaller geographical scale. These documents were however not reported.

1) Sub basin plans for SE 1: http://www.vattenmyndigheterna.se/Sv/bottenviken/vattenforvaltningens-arbetscykel/atgarder-for-battre-vatten/underlag-till-atgardsprogrammet-2010-2015/Pages/default.aspx
2) Sub basin plans for SE 2: http://www.vattenmyndigheterna.se/Sv/publikationer/Pages/default.aspx?catSub=cat_BH&doctype=18
3) Sub basin plans for SE 5: http://www.vattenmyndigheterna.se/Sv/vasterhavet/distriktets-organisation/delomraden/Pages/underlagsmaterial-per-kust--och-avrinningsomrade.aspx

The main RBMPs lack **transparency** regarding the effort needed, which measures are proposed and the consequences of the environmental objectives, and other matters; however the sub-basin documents provide some of that information. They have, however, not been included in this assessment since they were not reported to the Commission.

The RBMPs are a**dopted** by the River Basin District authority (Vattenmyndigheten), designated by the Government among the County Administrative boards (Länsstyrelserna). The Environmental objectives are adopted by a separate legal act – a decision by the co-ordinating Regional authority (RBD authority) for each RBD. RBMPs are information decisions that do not have a legally binding status. The programmes of measure (PoMs) are comprehensive documents which are binding on the municipalities and authorities. They are administrative decisions without the element of exercise of public authority towards individuals. The Environmental Code stipulates that programmes of measures have a legal

effect with regard to environmental quality standards. The stakeholders affected by this are those who pursue, or intend to pursue, an activity or take a measure.[6]

There is a relationship between the RBMPs and individual decisions. Each of the respective PoM refers to the "environmental quality standards[7]", which are adopted by the RBD Authorities. According to the Swedish authorities, all the measures prescribed in the PoMs refer to the fulfilment of these environmental quality standards, which are legally binding instruments that authorities, municipalities and environmental courts are obliged to observe when deciding on actions taken by individuals, operators, organisations etc.. The RBD authorities' PoMs, together with the environmental quality standards(EQS), become complementary policies for the relevant authorities and municipalities. The control is still at the administrative level because the water authorities have not been given a mandate under the law to decide on actions taken by individuals (operators, the public, organisations, etc.) to implement PoMs. In other words, it is still central and regional authorities and municipalities that are responsible for the enforcement of environmental law, but in accordance with the priorities for water quality issues established by the water authorities.[8]

3.4 Consultation of the public, engagement of interested parties

In the period prior to the draft RBMP,s , a number of "Reference groups" were established to ensure

- Mutual exchange of information
- A policy discussion
- Anchoring of the draft "water delegation"

Participants in the reference groups were the most important actors in the water policy of the RBD such as farmers associations, forestry, water companies etc.

From the compilation of comments to the draft RBMP, PoM etc. (example from SE 5) it seems as if the main impact has been an improved readability of the documents, some clarifications, but no significant changes in the substantial parts.

In most RBD, so-called Water Councils have been formed (mainly on sub-basin level) with the participation of relevant authorities (decision makers), organisations for the purpose of **ongoing involvement** of interested parties.. The aim of the Councils is to discuss efforts, incorporate local knowledge and, in the end, to obtain consensus on the measures to be taken.

The documentation on the consultation is **transparent.** Some concerns were however expressed in the consultation regarding the transparency of the RBMPs, due to the lack of specific measures.

---

[6] Pressures and Measures study, Task 1 Governance

[7] According to the Swedish authorities these "environmental quality standards"/"miljökvalitetsnormer" are equivalent to the environmental objectives of the WFD, and not the "EQS" established for specific chemical pollutants.

[8] Pressures and measures, Study, Governance

3.5 International co-operation and coordination

Sweden shares several river basins with Finland and a non-member state Norway, but no international RBMPs have been adopted.

The issue of international RBD has only been very briefly handled in the Swedish RBMPs. The same text is used in the two RBMPs sharing districts with Norway. The full length is: "Part of the RBD is situated in Norway. A number of meetings have been held between Swedish and Norwegian authorities concerning the co-operation and co-ordination of the water management for the areas in Norway included in the RBD."

A short chapter in the RBMP for the Bothnian Bay describes the international river basin Torne River shared with Finland with some of the same headlines as for the Swedish part of the RBD (protected areas, status, pressures, PoM, monitoring etc.) The PoM contains a very short chapter regarding common measures, which are entirely administrative.

The designation of RBDs in relation to the trans-boundary water courses shared with Finland and Norway is unclear. In the case of the catchment including the Klarälven/Göta älv, the hydrological boundaries have not been respected in the designation, since the source of the river is managed under SE2 – Bothnian Sea RBD.

4. CHARACTERISATION OF RIVER BASIN DISTRICTS

It appears that the process of characterisation has not yet been completed in Sweden, although the deadline for finalising this step was 22.12.2004 (article 5). Certain shortcomings in the monitoring network, notably groundwater operational monitoring, are said to be due to the fact that not all water bodies at risk and not all significant pressures have been identified.

4.1 Water categories in the RBD

All 4 water categories for surface water are used in Sweden, but only a few transitional water bodies have been designated (in SE 3 with one type and 19 water bodies and in SE 5 with one type and 2 WBs). The delineation of transitional waters has been done using a national approach (national guideline). The main factor for delineation has been the salinity.[9]

4.2 Typology of surface waters

A surface water typology has been developed for all types.

It is not clear from the RBMPs, if the typology has been **tested against biological data** – at least not for all the types, referred to in the available sources. Swedish authorities have clarified that an analysis has been carried out based on biological parameters – resulting in

[9] SMHI 2002/1796/1933

broader types based on eco regions[10], as set out in a 2007 Handbook on Classification of lakes and rivers.

The information about type specific **reference condition** values is unclear in the RBMPs. Reference conditions are developed differently depending on the type of pressures, for instance for nutrients they are calculated at water body level. In WISE, most reference values are reported as "not applicable" except for a few parameters in transitional and coastal waters. The RBMP for e.g. Västerhavet //Skagerrak and Kattegat RBD, SE 5 states on p. 41, that " In this planning cycle, reference values for assessing ecological status have not been stated fully on water type level". In a regulation, reference values are presented for a number of biological parameters for fresh water bodies divided on a number of eco-zones (e.g. 5 for lakes, 3 for rivers), and physical/chemical parameters in rivers and lakes.

For marine areas, some physical/chemical parameters (e.g. nutrients for 25 water types) and bio volume (algae) for 4 marine water types have been established.

[10] Bilaga A till Handbok 2007:4:"Bedömningsgrunder för sjöar och vattendrag". (http://www.naturvardsverket.se/Documents/publikationer/620-0148-3.pdf)

RBD	Rivers	Lakes	Transitional	Coastal
SE1	11	18	0	4
SE1TO	8	13	0	2
SE2	28	37	0	4
SE3	15	21	1	6
SE4	22	31	0	11
SE5	30	34	1	6
SENO1102	5	4	0	0
SENO1103	4	6	0	0
SENO1104	1	1	0	0
SENO5101	6	7	0	0
Total	*56 (52)**	*112 (75)*	*2*	*23 (25)*

Table 4.2.1: *Surface water body types at RBD level*
Note: **Number in brackets, Numbers reported to WISE, compared to numbers reported in the RBMPs.*
Source: *WISE*

The number of water types is very large, and exceeds considerably the number of water types (or eco-zones) referred to as tested against biological data. For rivers, and in particularly for lakes, the number of types reported in the SWB schema in WISE is much lower than that reported in the RBMPs, which refer to a national document from 2006.

The following background reports etc. have been reported:

- NFS 2006:1: Naturvårdsverkets föreskrifter om kartlägning och analys av ytvatten enligt förordningen (2004:660) om förvaltning av kvaliteten på vattenmiljön[11]./ (Swedish EPA guidance on characterisation and analysis of surface waters.)
- Handbok 2007:3: Kartlägning och analys av ytvatten. [12] & Handbok 2007:4 including annex A: Status potential och kvalitetskrav för sjöar, vattendrag, kustvatten och vatten och övergångszon[13].
- NFS 2008:1 Naturvårdsverkets föreskrifter och allmänna råd om klassificering och miljökvalitetsnormer avseende ytvatten. / (Swedish EPA guidelines on classification and environmental objectives for lakes, watercourses, coastal and transitional waters.)

[11] http://www.naturvardsverket.se/Documents/foreskrifter/nfs2006/nfs_2006_1.pdf

[12] http://www.naturvardsverket.se/Documents/publikationer/620-0146-9.pdf

[13] http://www.naturvardsverket.se/Documents/publikationer/620-0147-6.pdf

4.3 Delineation of surface water bodies

The general size limit for water bodies included in the Swedish RBMP is 15 km for rivers and 100 ha for lakes. In one RBMP (SE2) a catchment size of 10 km² has been used as a limit for river WBs. For coastal areas, no minimum limit has been used.

Waterbodies smaller than the general size limits mentioned above are protected by other Swedish legislation, i.e. they do not have their own Environmental quality standard according to the WFD. According to the SE authorities, a fundamental division has been made and restricted to the largest and most important water bodies due to the large numbers of all types of water bodies in Sweden.

RBD	Surface Water								Groundwater	
	Rivers		Lakes		Transitional		Coastal			
	Number	*Average Length (km)*	*Number*	*Average Area (sq km)*	*Number*	*Average Area (sq km)*	*Number*	*Average Area (sq km)*	*Number*	*Average Area (sq km)*
SE1	4221	5	1627	4	0	0	100	72	594	7
SE1TO	655	7	268	3	0	0	3	27	61	27
SE2	7295	4	3635	2	0	0	64	79	779	14
SE3	623	8	340	8	19	6	148	48	529	3
SE4	968	9	478	9	0	0	177	57	580	26
SE5	1650	7	790	7	2	30	110	47	477	14
SENO1102	48	3	18	2	0	0	0	0	0	0
SENO1103	69	3	52	2	0	0	0	0	1	1
SENO1104	3	4	1	4	0	0	0	0	0	0
SENO5101	31	6	23	2	0	0	0	0	0	0
Total	*15563*	*5*	*7232*	*4*	*21*	*9*	*602*	*58*	*3021*	*13*

Table 4.3.1: *Surface water bodies, groundwater bodies and their dimensions*
Note: *Please note these numbers do not correspond with the RBMPs, partly due to the unclear designation of the smaller RBDs and distribution of these to the respective main RBD..*
Source: *WISE*

4.4 Identification of significant pressures and impacts

The RBMPs state that the work to identify significant pressures is still ongoing, and that there is still a lack of data for this exercise. Preliminary criteria have been identified, and are referred to in the RBMPs.

On a national basis, 17 % of the surface water bodies are impacted by acidification, 100 % by hazardous substances (mercury, other substances are not systematically reported) and 13 % by nutrients. Hydromorphological alterations are reported to be as significant.

RBD	No pressures		Point source		Diffuse source		Water abstraction		Water flow regulations and morphological alterations		River management		Transitional and coastal water management		Other morphological alterations		Other pressures	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
SE1	0	0	15	0.25	5948	100	0	0	1423	23.92	1338	22.49	0	0	0	0	38	0.64
SE1TO	0	0	3	0.32	926	100	0	0	62	6.7	114	12.31	0	0	0	0	0	0
SE2	3	0.03	38	0.35	10991	99.97	1	0.01	3255	29.61	1452	13.21	0	0	0	0	163	1.48
SE3	0	0	51	4.51	1130	100	1	0.09	477	42.21	286	25.31	0	0	0	0	238	21.06
SE4	0	0	82	5.05	1623	100	47	2.9	530	32.66	444	27.36	0	0	0	0	178	10.97
SE5	0	0	115	4.51	2552	100	29	1.14	984	38.56	478	18.73	0	0	0	0	470	18.42
SENO1102	0	0	0	0	66	100	0	0	5	7.58	0	0	0	0	0	0	0	0
SENO1103	0	0	0	0	121	100	0	0	0	0	0	0	0	0	0	0	0	0
SENO1104	0	0	0	0	4	100	0	0	0	0	0	0	0	0	0	0	0	0
SENO5101	0	0	0	0	54	100	0	0	5	9.26	8	14.81	0	0	0	0	0	0
Total	*3*	*0.01*	*304*	*1.3*	*23415*	*99.99*	*78*	*0.33*	*6741*	*28.79*	*4120*	*17.59*	*0*	*0*	*0*	*0*	*1087*	*4.64*

Table 4.4.1: *Number and percentage of surface water bodies affected by significant pressures*
Source: *WISE*

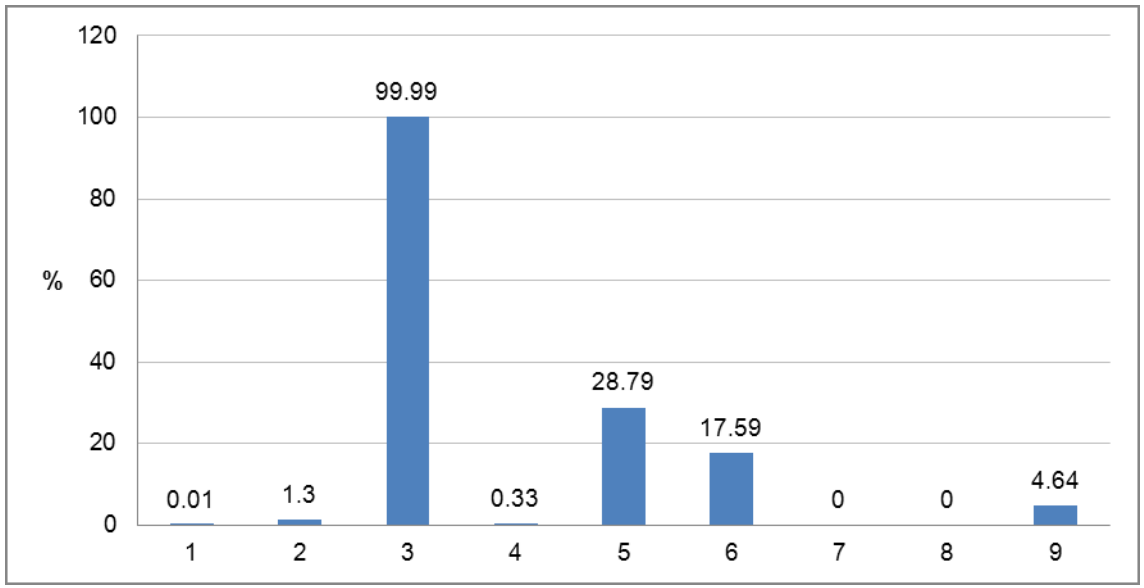


Figure 4.4.1: *Graph of percentage of surface water bodies affected by significant pressures*
1 = No pressures
2 = Point source
3 = Diffuse source
4 = Water abstraction
5 = Water flow regulations and morphological alterations
6 = River management
7 = Transitional and coastal water management
8 = Other morphological alterations
9 = Other pressures
Source: *WISE*

The information in the RBMPs on which tools have been used to identify significant **point** sources is unclear, or no information has been provided. Point sources are, as a starting point, defined as activities covered by the IPPC directive and installations covered by the UWWT directive.

Numerical tools have been used to identify significant **diffuse sources** from agriculture, urban run-off and facilities not connected to sewerage, and numerical thresholds are provided. Diffuse sources are leakage from agriculture and forestry, discharge from groups of single houses and atmospheric deposition. A differentiated source apportionment for phosphorus and nitrogen is presented for all Swedish RBDs but SE 1 (not relevant) and the proportion of phosphorus and nitrogen, which reaches the marine areas (i.e. the retention) is calculated. Threshold criteria are mentioned for phosphorus.

For the pressure, **water abstraction**, no information has been found about the tools or methods for defining abstraction as a main pressure. Swedish authorities have however clarified that methods for assessment of ground water are under development.

For **hydro-morphological pressures**, such as flow regulation and morphological alternations a number of different methods have been used, including data based (field data etc.), simple models, expert judgment and combinations. Model based assessments have also been used for defining the pressure from acidification. [14]

The information on **chemical pollution** and the main sources is very limited and general. Industry, agriculture, forestry, anti-fouling paint on boats (TBT), pharmaceuticals discharged from waste water treatment works, and historically contaminated sites are generally mentioned as sources, but not in any way quantified. Mercury pollution (mainly from atmospheric deposition) is causing all Swedish surface water bodies to fail to reach a good chemical status. No threshold values for significance have been reported.

Background document : NFS 2007:3: Handbok 2007:3: Kartlägning och analys av ytvatten. http://www.naturvardsverket.se/Documents/publikationer/620-0146-9.pdf

[14] NFS 2007:3: Handbok 2007:3: Kartlägning och analys av ytvatten. http://www.naturvardsverket.se/Documents/publikationer/620-0146-9.pdf

4.5 Protected areas

Sweden applies more stringent waste water treatment in the whole of its territory and therefore, in accordance to article 5.8 of the Urban Waste Water Directive 1991/271/EEC, it is exempted from designation of specific sensitive areas.

RBD	Number of PAs										
	Article 7 Abstraction for drinking water	Bathing	Birds	European Other	Fish	Habitats	Local	National	Nitrates	Shellfish	UWWT
SE1	129	15	23		4	165					3
SE1TO	15		5			24					3
SE2	227	11	80		3	293					3
SE3	206	102	68		2	195			2		5
SE4	252	169	130		9	365			2		4
SE5	267	172	80		10	223			2	32	4
SENO1102			1			3					2
SENO1103			2			6					2
SENO1104						3					2
SENO5101	3		2			9			1		3
Total	*1099*	*469*	*391*		*28*	*1286*			*7*	*32*	*31*

Table 4.5.1: *Number of protected areas of all types in each RBD and for the whole country, for surface and groundwater*
Note : *This information corresponds to the reporting of protected areas under the WFD. More/other information may have been reported under the obligations of other Directives.*
Source: *WISE*

5. MONITORING

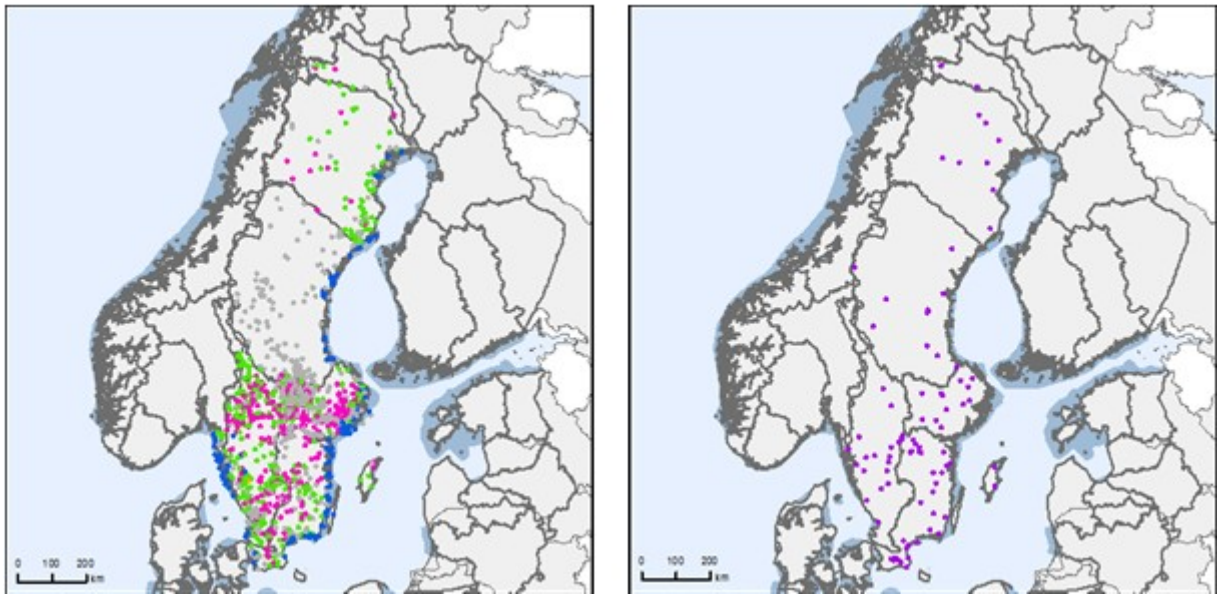


Figure 5.1: *Maps of surface water (left) and groundwater (right) monitoring stations*

- *River monitoring stations*
- *Lake monitoring stations*
- *Transitional water monitoring stations*
- *Coastal water monitoring stations*
- *Unclassified surface water monitoring stations*
- *Groundwater monitoring stations*
- *River Basin Districts*
- *Countries outside EU*

Source: *WISE, Eurostat (country borders)*

There has been no change of monitoring stations between article 8 and article 13 reporting, but the RBMPs state that the monitoring programmes are being revised to become more WFD compliant from 2012 onwards. There are also some inconsistencies between the information on monitoring provided in the RBMPs and to WISE.

Monitoring has mainly been physico-chemical, including a few BQEs in a few water bodies (phytoplankton, benthic inverts and fish), and were based on the old monitoring programmes ("business as usual").

RBD	Rivers											Lakes										
	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.3 Macrophytes	QE1.2.4 Phytobenthos	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 on priority specific pollutants	QE3.4 Other national pollutants	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.3 Macrophytes	QE1.2.4 Phytobenthos	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 Non priority specific pollutants	QE3.4 Other national pollutants
SE1																						
SE1TO																						
SE2																						
SE3																						
SE4																						
SE5																						
SENO1102																						
SENO1103																						
SENO1104																						
SENO5101																						

RBD	Transitional											Coastal										
	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.1 Microalgae	QE1.2.2 Angiosperms	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 Non priority specific pollutants	QE3.4 Other national pollutants	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.1 Microalgae	QE1.2.2 Angiosperms	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 Non priority specific pollutants	QE3.4 Other national pollutants
SE1																						
SE1TO																						
SE2																						
SE3																						
SE4																						
SE5																						
SENO1102																						
SENO1103																						
SENO1104																						
SENO5101																						

Table 5.1: *Quality elements monitored*

QE Monitored

QE Not monitored

\- *Not Relevant*

Source: *WISE*

RBD	Rivers		Lakes		Transitional		Coastal		Groundwater		
	Surv	**Op**	**Surv**	**Op**	**Surv**	**Op**	**Surv**	**Op**	**Surv**	**Op**	**Quant**
SE1	40	81	25	0	0	0	4	13	17	0	0
SE2	23	81	9	38	0	0	2	39	16	0	0
SE3	92	145	234	440	1	0	74	0	16	0	0
SE4	43	86	41	48	0	0	1	71	38	0	0
SE5	35	367	28	127	1	1	31	9	28	0	0
SENO5101	1	9	1	0	0	0	0	0			
Total by type of site	*234*	*769*	*338*	*653*	*2*	*1*	*112*	*132*	*115*	*0*	*0*
*Total number of monitoring sites**	*1002*		*978*		*3*		*243*		*115*		

Table 5.2: *Number of monitoring sites by water category.*
Surv = Surveillance
Op = Operational
Quant = Quantitative
Note : *The total number of monitoring sites may differ from the sum of monitoring sites by type because some sites are used for more than one purpose.*
Source: *WISE*

5.1 Monitoring of surface waters

The table below shows the missing QEs (biological, physico-chemical and hydromorphological elements).

Quality element groups	QEs missing	Justification given
BQEs	Macrophytes missing in rivers Phytobenthos missing in lakes Angiosperms missing in transitional and coastal waters and Fish missing in transitional waters.	BQE methods are new and SE is working to redesign the monitoring programmes to use more BQEs. Revised programmes are planned to be ready in 2012. Fish not done in transitional waters due to high variability and few transitional WBs. There is no justification given why macrophytes are not monitored in lakes, nor why phytobenthos is not monitored in rivers. Macrophytes in rivers not done due to lack of data compilation and assessment method. Data compilation and development of assessment system is now ongoing with NO and FI
Physico-chemical QEs	Nutrients missing in transitional and coastal waters, and Nitrogen is missing in rivers and lakes monitoring	No justification was given by the time of adoption of the RBMPs as to why nutrients are missing in transitional and coastal waters. Nitrogen not monitored in rivers and lakes due to P-limitation in freshwater SE have data on Phys-chem QEs (nutrients and acidification relevant parameters) for many more freshwater bodies (18000 stations) than those included in the monitoring programmes reported for the WFD, coming from several national screening surveys.
Hydromorphological QEs	All HyMo QEs are missing in lakes and transitional and coastal waters	Existing methods are not good enough for assessment. New methods are being developed in a number of research projects.

Table 5.1.1: *Quality elements missing in monitoring, according to clarifications from the Swedish authorities.*
Notes: *Table is based on clarifications from the Swedish authorities. See also Commission report of 2009, Annex on MS methods (http://ec.europa.eu/environment/water/water-framework/implrep2007/pdf/sec_2009_415_2_en.pdf :*
Source: *Swedish authorities*

Although Swedish authorities have provided justifications for not monitoring certain quality elements, these justifications are contested. Lack of monitoring of river macrophytes cannot be justified from lack of assessment methods, as data are pre-requisite to develop an assessment system. Lack of nitrogen monitoring in rivers/lakes prevents estimation of nitrogen loads to transitional and coastal waters, where nitrogen is often the limiting factor for phytoplankton production.

No WFD-compliant **operational monitoring programmes** were in place for the first RBMPs, according to the RBMPs for SE3 and SE5, but are planned in 2012 (see below on chemical monitoring). The monitoring programmes Sweden used for the first RBMPs were mainly based on the previously existing programmes. It is unclear what the number of monitoring operational monitoring stations for surface waters reported to WISE actually represents, as this is contradictory to the information given in the RBMPs.

It is not clear from the RBMPs if all **priority substances and relevant specific pollutants** have been monitored and in which matrix. The criteria/methodology used to select substances for monitoring in the survey carried out to identify relevant substances is unclear. Sweden has provided some clarifications**.** The selection process and matrix to be used for monitoring are given in the Swedish EPA report 5801[15]. One RBD identified relevant specific pollutants. The relevant substances including metals: Cu, Zn, Cr, As, and POPs: PCBs, DDT, HBCD, perfluorinated substances (PFOS, amongst others), other organotin compounds (in addition to TBT, such as dibutyltin, monobutyltin, triphenyltin). EQS values for 30 specific pollutants given in Swedish EPA report 5799[16]. To assess long-term trends in long-range trans-boundary pollution, the sites selected in the national monitoring programmes are far from local pollution sources. Operational monitoring is done in water bodies at risk through regional programmes of recipient waters inspection. In four intensive agricultural areas, over 120 substances are monitored in water, and more than 60 in sediment. This screening information basis was not ready in time for the first RBMPs, but will be used for the coming RBMPs. **Sediment and biota** are used to monitor some priority substances and specific pollutants.

Extensive **grouping of water bodies** seems to be used, due to the large number of water bodies in Sweden (> 20 000 WBs) and the few monitoring stations. Ecological status has been assessed for all water bodies, but only 6% of rivers WBs, 12% of lake WBs, 15% of transitional WBs and 43% of coastal WBs were included in operational monitoring for the first RBMP. A methodology for grouping is described in the national classification guidance, but it seems it wasn't applied for the first RBMP. Swedish authorities have clarified that, grouping has not been so extensively applied, because also modelling and data from previous screening surveys have been used for assessing ecological status of WBs.

No **coordinated international monitoring** was established for international waters in the first RBMPs.. For the Torne river between SE and FI (and NO for the minor northernmost part) a coordinated monitoring programme has now been designed for use in the second RBMP.

The **number of monitoring stations** were not changed significantly between the article 8 reporting and the article 13 reporting, but are now being revised.

There is no national guidance on monitoring. There are national guidance documents only for classification of ecological status, , see under ecological status below.

5.2 Monitoring of groundwater

There has been no **quantitative monitoring** programme for groundwater for the first RBMPs, but the ground water level is monitored at 330 sites (by the Swedish Geological Survey) and will provide the basis for quantitative monitoring for the next RBMP cycle.

There is no **operational monitoring** of GW, **but surveillance monitoring** is reported for 4% of all groundwater bodies(115 GWBs – the same as reported in the 2009 Commission

[15] http://www.naturvardsverket.se/Documents/publikationer/620-5801-2.pdf

[16] http://www.naturvardsverket.se/Documents/publikationer/620-5799-2.pdf

report). Based on results from this programme, parameters will be selected for operational monitoring for the next cycle of RBMPs.

According to the RBMP for SE3, 8 groundwater bodies have exceeded limit values for certain chemical substances and exemptions have been used for these.

No international monitoring programme of groundwater is in place.

The number of groundwater monitoring (surveillance) is 115, which is exactly the same as reported in the 2009 Commission report.

There is no national guidance on groundwater monitoring.

5.3 Monitoring of protected areas

There is no specific monitoring programme in place for surface water or groundwater protected areas. Only local monitoring is carried out for drinking water areas, and there is no national guidance available as to how that should be done. Data from this local monitoring is stored in a national database hosted by the Swedish geological survey.

In the article 8 reports, no information was given on the number of monitoring stations for surface water protected areas, while 28 GW PAs were reported. According to WISE there is still no information on this. Monitoring stations are only reported if the information was not reported under other Directives. Sweden has reported 2417 monitoring stations for the Nitrates Directive.

6. OVERVIEW OF STATUS (ECOLOGICAL, CHEMICAL, GROUNDWATER)[17]

RBD	Total	High		Good		Moderate		Poor		Bad		Unknown	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
SE1	5779	848	14.7	3154	54.6	1281	22.2	423	7.3	73	1.3	0	0
SE1TO	926	646	69.8	179	19.3	81	8.7	20	2.2	0	0	0	0
SE2	10727	443	4.1	5515	51.4	3757	35.0	724	6.7	288	2.7	0	0
SE3	1111	1	0.1	271	24.4	651	58.6	146	13.1	42	3.8	0	0
SE4	1603	17	1.1	634	39.6	725	45.2	170	10.6	57	3.6	0	0
SE5	2376	7	0.3	1161	48.9	1029	43.3	133	5.6	46	1.9	0	0
SENO1102	62	29	46.8	30	48.4	3	4.8	0	0	0	0	0	0
SENO1103	121	48	39.7	73	60.3	0	0	0	0	0	0	0	0
SENO1104	4	4	100	0	0	0	0	0	0	0	0	0	0
SENO5101	54	0	0	37	68.5	16	29.6	1	1.9	0	0	0	0
Total	*22763*	*2043*	*9.0*	*11054*	*48.6*	*7543*	*33.1*	*1617*	*7.1*	*506*	*2.2*	*0*	*0*

***Table 6.1**: Ecological status of natural surface water bodies.*
***Source:** WISE*

RBD	Total	High		Good		Moderate		Poor		Bad		Unknown	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
SE1	169	0	0	2	1.2	167	98.8	0	0	0	0	0	0
SE1TO	0	0	0	0	0	0	0	0	0	0	0	0	0
SE2	267	0	0	5	1.9	262	98.1	0	0	0	0	0	0
SE3	19	0	0	0	0	19	100	0	0	0	0	0	0
SE4	20	0	0	1	5.0	19	95.0	0	0	0	0	0	0
SE5	176	0	0	3	1.7	45	25.6	0	0	0	0	128	72.7
SENO1102	4	0	0	0	0	4	100	0	0	0	0	0	0
SENO1103	0	0	0	0	0	0	0	0	0	0	0	0	0
SENO1104	0	0	0	0	0	0	0	0	0	0	0	0	0
SENO5101	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	*655*	*0*	*0*	*11*	*1.7*	*516*	*78.8*	*0*	*0*	*0*	*0*	*128*	*19.5*

***Table 6.2:** Ecological potential of artificial and heavily modified water bodies.*
***Source:** WISE*

[17] Please note the numbers reported to WISE do not always correspond to numbers reported in the RBMPs.

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
SE1	5779	2	0.03	5777	100	0	0
SE1TO	926	0	0	926	100	0	0
SE2	10727	0	0	10727	100	0	0
SE3	1111	0	0	1111	100	0	0
SE4	1603	0	0	1603	100	0	0
SE5	2376	0	0	2376	100	0	0
SENO1102	62	0	0	62	100	0	0
SENO1103	121	1	0.8	120	99.2	0	0
SENO1104	4	0	0	4	100	0	0
SENO5101	54	0	0	54	100	0	0
Total	*22763*	*3*	*0.01*	*22760*	*99.99*	*0*	*0*

Table 6.3: *Chemical status of natural surface water bodies.*
Note : *The data includes the status based on Mercury, as reported to WISE. The RBMPs present the data, excluding Mercury.*
Source: *WISE*

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
SE1	169	0	0	169	100	0	0
SE1TO	0	0	0	0	0	0	0
SE2	267	0	0	267	100	0	0
SE3	19	0	0	19	100	0	0
SE4	20	0	0	20	100	0	0
SE5	176	0	0	176	100	0	0
SENO1102	4	0	0	4	100	0	0
SENO1103	0	0	0	0	0	0	0
SENO1104	0	0	0	0	0	0	0
SENO5101	0	0	0	0	0	0	0
Total	*655*	*0*	*0*	*655*	*100*	*0*	*0*

Table 6.4: *Chemical status of artificial and heavily modified water bodies*
Note : *The data includes the status based on Mercury, as reported to WISE. The RBMPs present the data, excluding Mercury.*
Source: *WISE*

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
SE1	594	594	100	0	0	0	0
SE1TO	61	61	100	0	0	0	0
SE2	779	767	98.5	12	1.5	0	0
SE3	529	521	98.5	8	1.5	0	0
SE4	580	562	96.9	18	3.1	0	0
SE5	477	455	95.4	22	4.6	0	0
SENO1103	1	1	100	0	0	0	0
Total	*3021*	*2961*	*98*	*60*	*2*	*0*	*0*

Table 6.5: *Chemical status of groundwater bodies.*
Source: *WISE*

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
SE1	594	259	43.6	0	0	335	56.4
SE1TO	61	5	8.2	0	0	56	91.8
SE2	779	779	100	0	0	0	0
SE3	529	529	100	0	0	0	0
SE4	580	576	99.3	4	0.7	0	0
SE5	477	476	99.8	1	0.2	0	0
SENO1103	1	1	100	0	0	0	0
Total	*3021*	*2625*	*86.9*	*5*	*0.2*	*391*	*12.9*

Table 6.6: *Quantitative status of groundwater bodies.*
Source: *WISE*

RBD	Total	Global status (ecological and chemical)					Good ecological status 2021*		Good chemical status 2021		Good ecological status 2027*		Good chemical status 2027		Global exemptions 2009 (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 - 2015									Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	No.	%	No.	%	%	%	%	%
SE1	5948	2	0.03	2	0.03	0.0				100					30	100	0	0
SE1TO	926	0	0.0	0	0.0	0.0									11	100	0	0
SE2	10994	0	0.0	0	0.0	0.0									37	100	0	0
SE3	1130	0	0.0	0	0.0	0.0									75	100	0	0
SE4	1623	0	0.0	0	0.0	0.0									51	100	0	0
SE5	2552	0	0.0	0	0.0	0.0									51	100	0	0
SENO1102	66	0	0.0	0	0.0	0.0									8	100	0	0
SENO1103	121	1	0.8	1	0.8	0.0									0	100	0	0
SENO1104	4	0	0.0	0	0.0	0.0									0	100	0	0
SENO5101	54	0	0.0	0	0.0	0.0									24	100	0	0
Total	*23418*	*3*	*0.01*	*3*	*0.01*	*0.0*									*38*	*100*	*0*	*0*

Table 6.7: *Surface water bodies: overview of status in 2009 and expected status in 2015, 2021 and 2027**
Waterbodies with good status in 2009 fall into the following category:
1. Ecological status is high or good and the chemical status is good, exemptions are not considered
Waterbodies expected to achieve good status in 2015 fall into the following categories:
1. Ecological status is high or good and the chemical status is good, exemptions are not considered
2. Chemical status is good, and the ecological status is moderate or below but no ecological exemptions
3. Ecological status is high or good, and the chemical status is failing to achieve good but there are no chemical exemptions
4. Ecological status is moderate or below, and chemical status is failing to achieve good but there are no ecological nor chemical exemptions
Notes: *Waterbodies with unknown/unclassified/Not applicable in either ecological or chemical status are not considered*
***** *Natural surface water bodies only*
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

RBD	Total	Ecological status					Good ecological status 2021		Good ecological status 2027		Ecological exemptions (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
SE1	5779	4002	69.3	4134	71.5	2.3					28.5	0	0	0
SE1TO	926	825	89.1	828	89.4	0.3					10.6	0	0	0
SE2	10727	5958	55.5	6906	64.4	8.8					35.6	0	0	0
SE3	1111	272	24.5	279	25.1	0.6					74.9	0	0	0
SE4	1603	651	40.6	793	49.5	8.9					50.5	0	0	0
SE5	2376	1168	49.2	1211	51.0	1.8					49.0	0	0	0
SENO1102	62	59	95.2	61	98.4	3.2					1.6	0	0	0
SENO1103	121	121	100	121	100	0					0	0	0	0
SENO1104	4	4	100	4	100	0					0	0	0	0
SENO5101	54	37	68.5	41	75.9	7.4					24.1	0	0	0
Total	*22763*	*13097*	*57.5*	*14378*	*63.1*	*5.6*					*36.8*	*0*	*0*	*0*

Table 6.8: *Natural surface water bodies: ecological status in 2009 and expected status in 2015, 2021 and 2027*
Note: *Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.***:**
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

RBD	Total	Chemical status					Good chemical status 2021		Good chemical status 2027		Chemical exemptions (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
SE1	5779	2	0.03	2	0.03	0					0	100	0	0
SE1TO	926	0	0	0	0	0					0	100	0	0
SE2	10727	0	0	0	0	0					0	100	0	0
SE3	1111	0	0	0	0	0					0	100	0	0
SE4	1603	0	0	0	0	0					0	100	0	0
SE5	2376	0	0	0	0	0					0	100	0	0
SENO1102	62	0	0	0	0	0					0	100	0	0
SENO1103	121	1	0.8	1	0.8	0					0	100	0	0
SENO1104	4	0	0	0	0	0					0	100	0	0
SENO5101	54	0	0	0	0	0					0	100	0	0
Total	*22763*	*3*	*0.01*	*3*	*0.01*	*0*					*0*	*100*	*0*	*0*

Table 6.9: *Natural surface water bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027*
Note : *Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.*
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

RBD	Total	GW chemical status					Good chemical status 2021		Good chemical status 2027		GW chemical exemptions (% of all GWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
SE1	594	594	100	594	100	0		100		100	0	0	0	0
SE1TO	61	61	100	61	100	0					0	0	0	0
SE2	779	767	98.5	767	98.5	0		100			2	0	0	0
SE3	529	521	98.5	521	98.5	0					2	0	0	0
SE4	580	562	96.9	562	96.9	0	580	100			3	0	0	0
SE5	477	455	95.4	455	95.4	0					5	0	0	0
SENO1102	0	0	0	0	0	0					0	0	0	0
SENO1103	1	1	100	1	100	0					0	0	0	0
SENO1104	0	0	0	0	0	0					0	0	0	0
SENO5101	0	0	0	0	0	0					0	0	0	0
Total	*3021*	*2961*	*98.0*	*2961*	*98.0*	*0*					*2*	*0*	*0*	*0*

Table 6.10: *Groundwater bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027*
Note : *Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs*
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

RBD	Total	Groundwater quantitative status					Good quantitative status 2021		Good quantitative status 2027		GW quantitative exemptions (% of all GWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
SE1	594	259	43.6	259	43.6	0		100		100	0	0	0	0
SE1TO	61	5	8.2	5	8.2	0					0	0	0	0
SE2	779	779	100	779	100	0					0	0	0	0
SE3	529	529	100	529	100	0					0	0	0	0
SE4	580	576	99.3	580	100	0.7					0	0	0	0
SE5	477	476	99.8	476	99.8	0					0	0	0	0
SENO1102	0	0	0	0	0	0					0	0	0	0
SENO1103	1	1	100	1	100	0					0	0	0	0
SENO1104	0	0	0	0	0	0					0	0	0	0
SENO5101	0	0	0	0	0	0					0	0	0	0
Total	*3021*	*2625*	*86.9*	*2629*	*87*	*0.1*					*0*	*0*	*0*	*0*

Table 6.11: *Groundwater bodies: quantitative status in 2009 and expected status in 2015, 2021 and 2027*
Note : *Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.*
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

RBD	Total HMWB and AWB	Ecological potential					Good ecological potential 2021		Good ecological potential 2027		Ecological exemptions (% of all HMWB/AWB)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
SE1	169	2	1.2	5	3.0	1.8	167				98.2	0	0	0
SE1TO	0	0	0	0	0	0					0	0	0	0
SE2	267	5	1.9	26	9.7	7.9		100			90.3	0	0	0
SE3	19	0	0	0	0	0	19	100			100	0	0	0
SE4	20	1	5.0	4	20.0	15.0	17	68	20	100	80.0	0	0	0
SE5	176	3	1.7	3	1.7	0		94			25.6	0	0	0
SENO1102	4	0	0	0	0	0					100	0	0	0
SENO1103	0	0	0	0	0	0					0	0	0	0
SENO1104	0	0	0	0	0	0					0	0	0	0
SENO5101	0	0	0	0	0	0					0	0	0	0
Total	*655*	*11*	*1.7*	*38*	*5.8*	*4.1*					*75.0*	*0*	*0*	*0*

Table 6.12: *Heavily modified and artificial water bodies: ecological potential in 2009 and expected ecological potential in 2015, 2021 and 2027*
Note : *Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.*
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

RBD	Total HMWB and AWB	Chemical status					Good chemical status 2021		Good chemical status 2027		Chemical exemptions (% of all HMWB/AWB)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
SE1	169	0	0	0	0	0					0	0	0	0
SE1TO	0	0	0	0	0	0					0	0	0	0
SE2	267	0	0	0	0	0					0	0	0	0
SE3	19	0	0	0	0	0					0	0	0	0
SE4	20	0	0	0	0	0					0	0	0	0
SE5	176	0	0	0	0	0					0	0	0	0
SENO1102	4	0	0	0	0	0					0	0	0	0
SENO1103	0	0	0	0	0	0					0	0	0	0
SENO1104	0	0	0	0	0	0					0	0	0	0
SENO5101	0	0	0	0	0	0					0	0	0	0
Total	*655*	*0*	*0*	*0*	*0*	*0*					*0*	*0*	*0*	*0*

Table 6.13: *Heavily modified and artificial water bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027*
Note : *Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.*
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

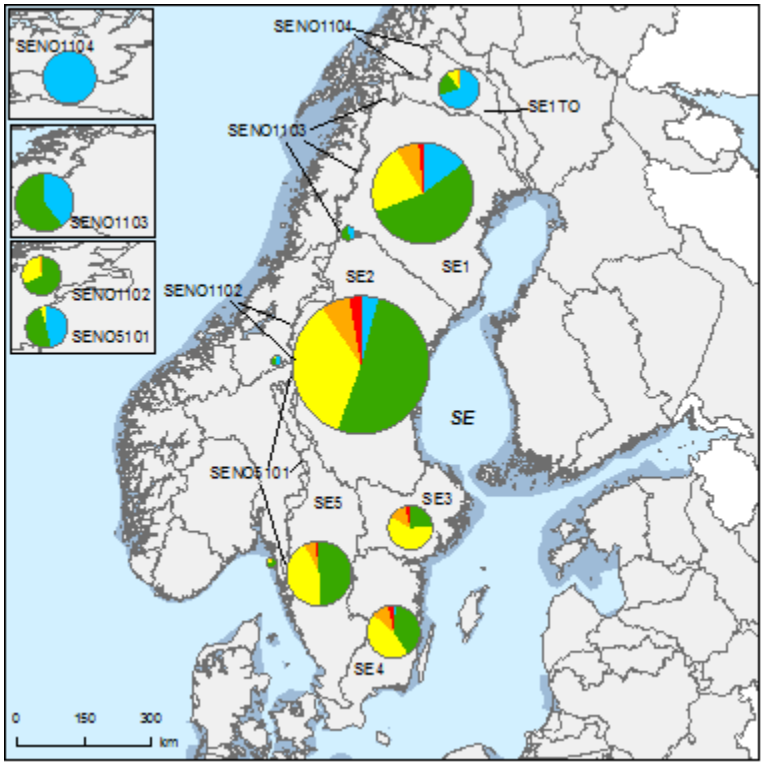


Figure 6.1: *Map of ecological status of natural surface water bodies 2009*
Note: *Standard colours based on WFD Annex V, Article 1.4.2(i).*
Source: *WISE, Eurostat (country borders)*

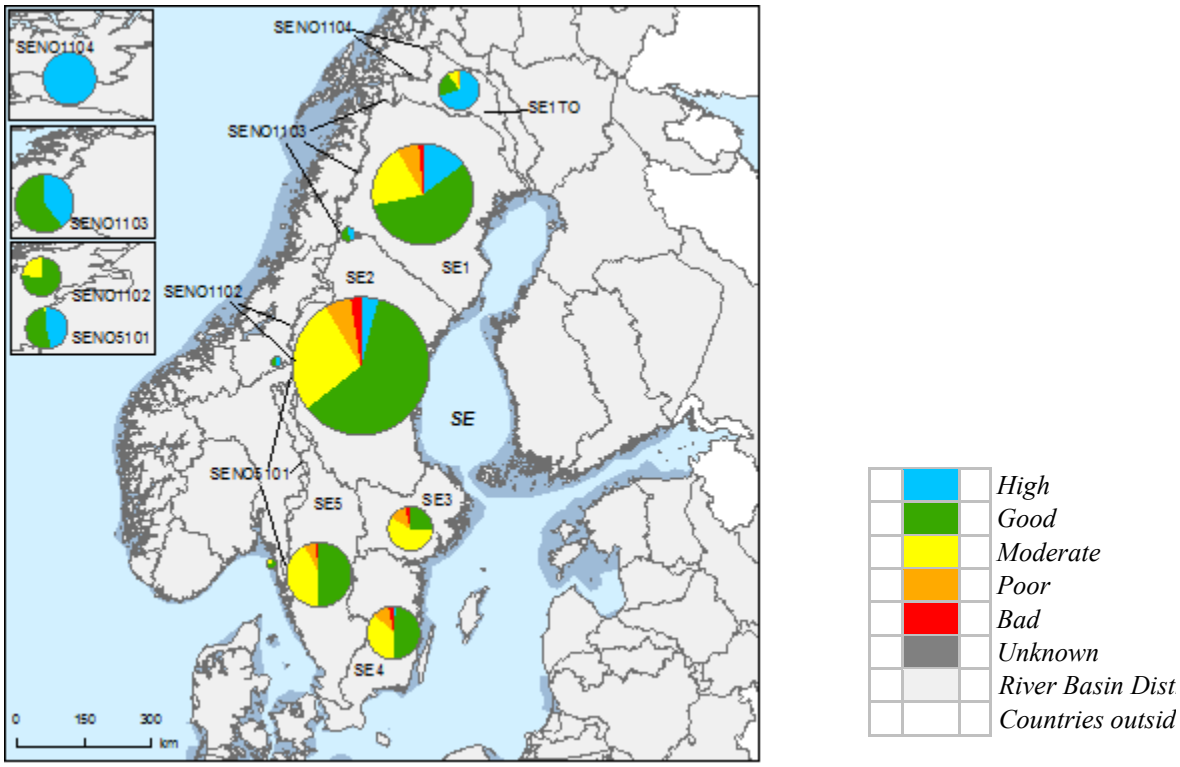


Figure 6.2: *Map of ecological status of natural surface water bodies 2015*

Note: *Standard colours based on WFD Annex V, Article 1.4.2(i).*
Source: *WISE, Eurostat (country borders)*

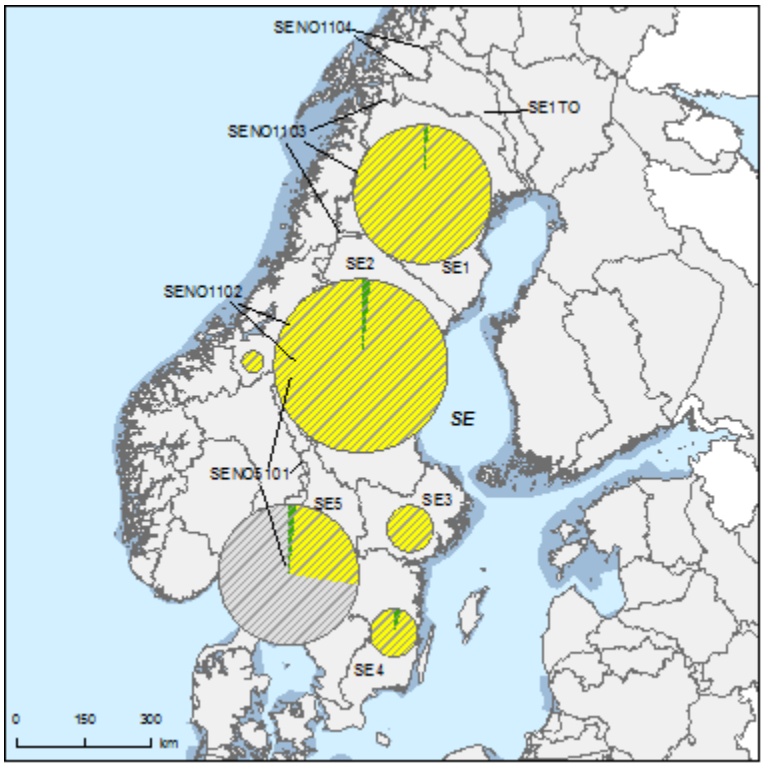


Figure 6.3: *Map of ecological potential of artificial and heavily modified water bodies 2009*
Note: *Standard colours based on WFD Annex V, Article 1.4.2(ii).*
Source: *WISE, Eurostat (country borders)*

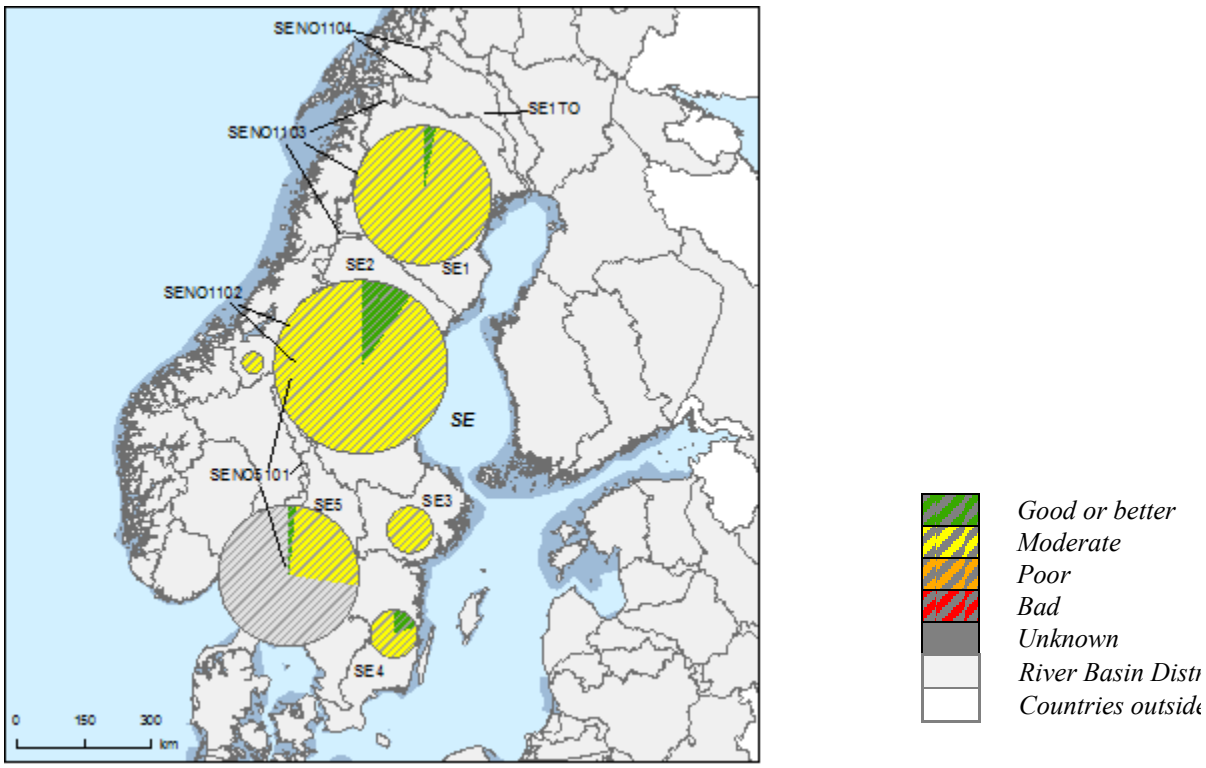


Figure 6.4: *Map of ecological potential of artificial and heavily modified water bodies 2015*
Note: *Standard colours based on WFD Annex V, Article 1.4.2(ii).*
Source: *WISE, Eurostat (country borders)*

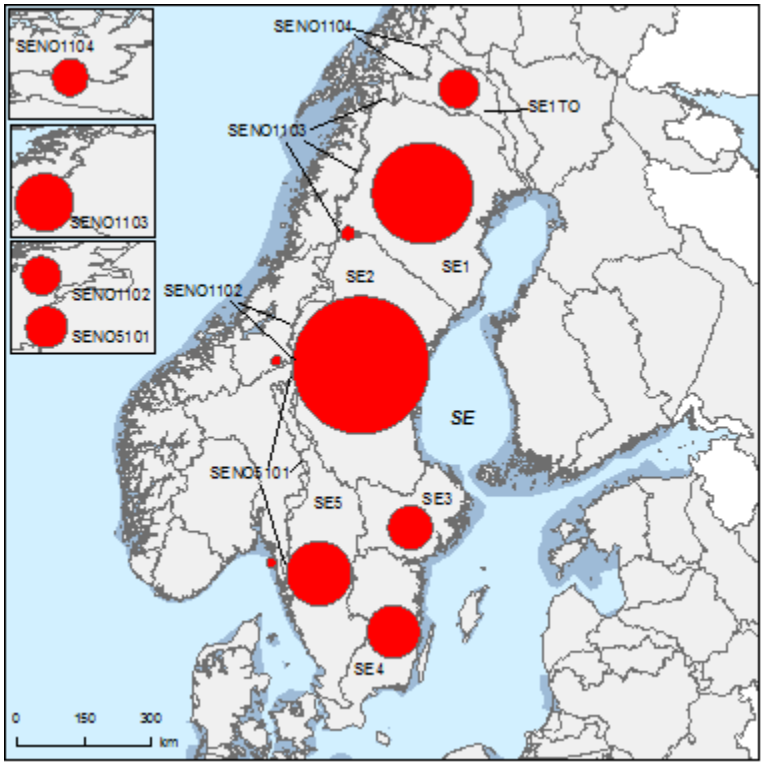
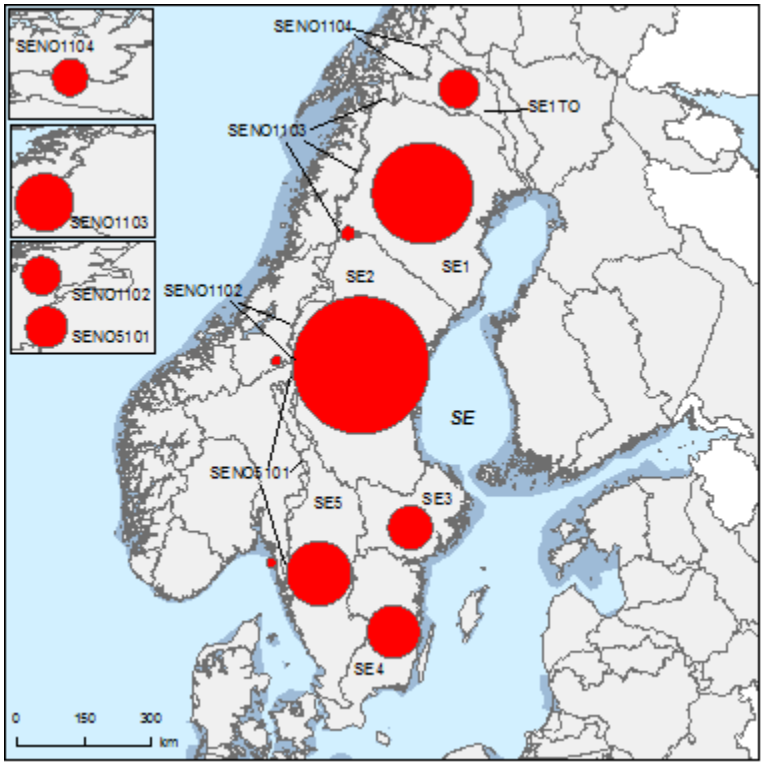


Figure 6.5: *Map of chemical status of natural surface water bodies 2009*
Note: *Standard colours based on WFD Annex V, Article 1.4.3.*
Source: *WISE, Eurostat (country borders)*



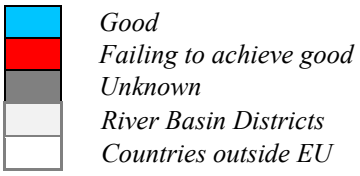


Figure 6.6: *Map of chemical status of natural surface water bodies 2015*
Note: *Standard colours based on WFD Annex V, Article 1.4.3.*
Source: *WISE, Eurostat (country borders)*

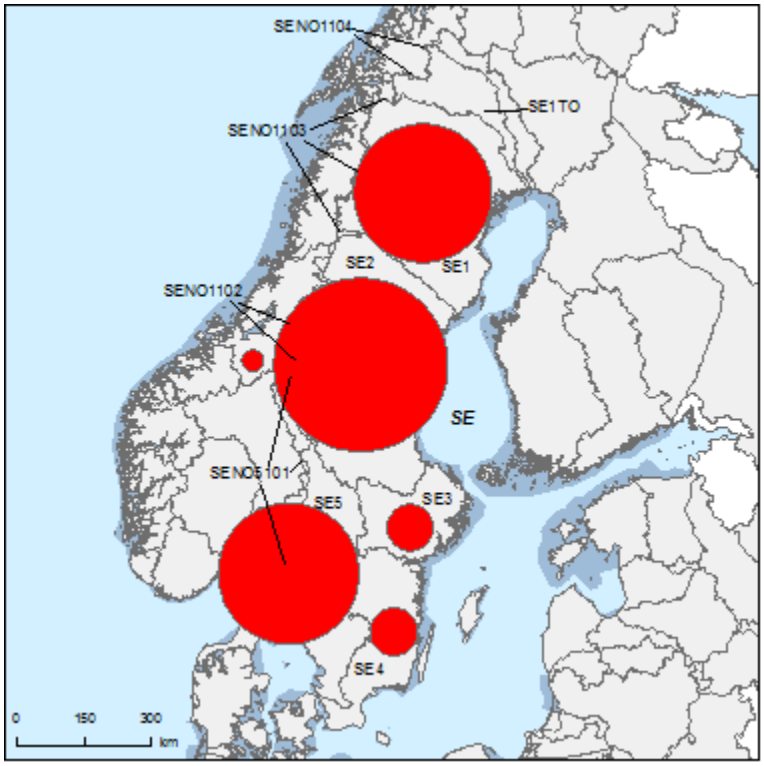


Figure 6.7: *Map of chemical status of artificial and heavily modified water bodies 2009*
Note: *Standard colours based on WFD Annex V, Article 1.4.3.*
Source: *WISE, Eurostat (country borders)*

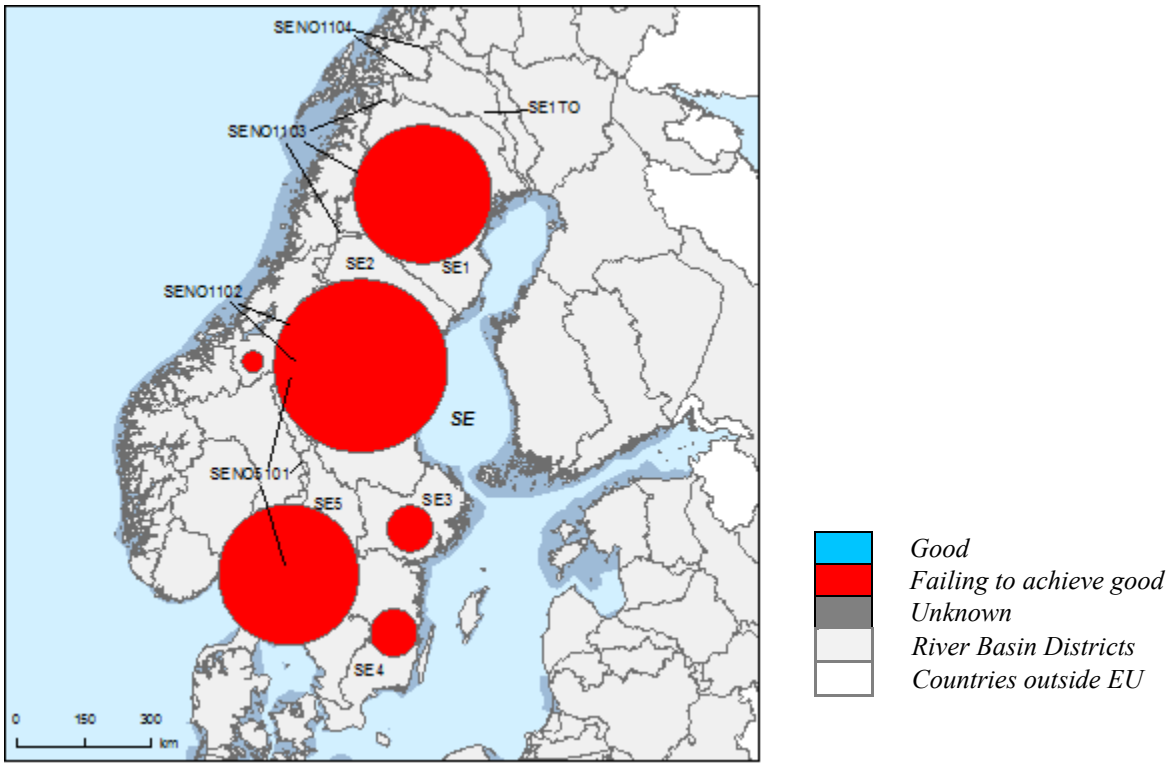


Figure 6.8: *Map of chemical status of artificial and heavily modified water bodies 2015*
Note: Standard colours based on WFD Annex V, Article 1.4.3.

Source: *WISE, Eurostat (country borders)*

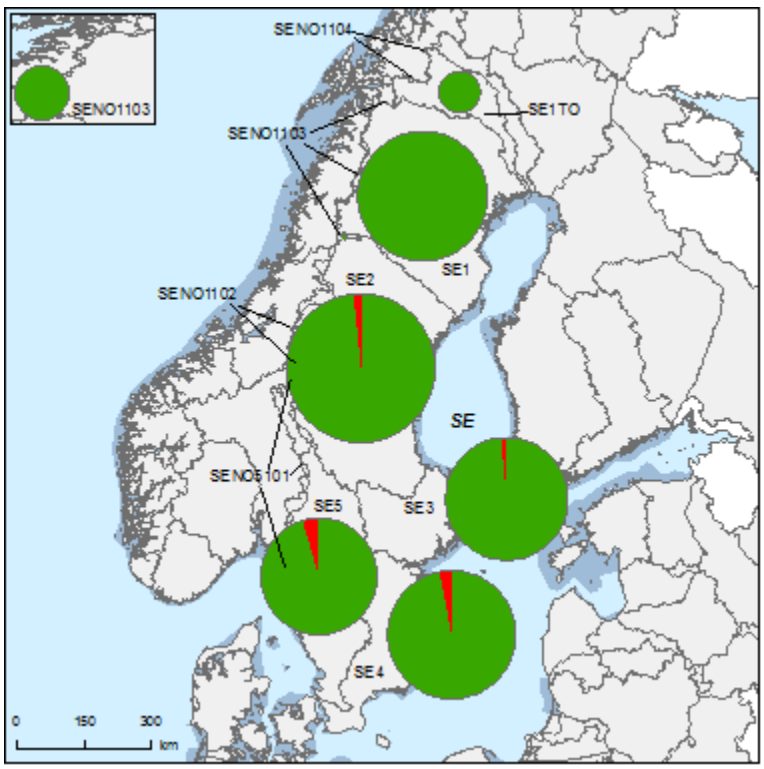


Figure 6.9: *Map of chemical status of groundwater bodies 2009*
Note: *Standard colours based on WFD Annex V, Article 2.4.5.*
Source: *WISE, Eurostat (country borders)*

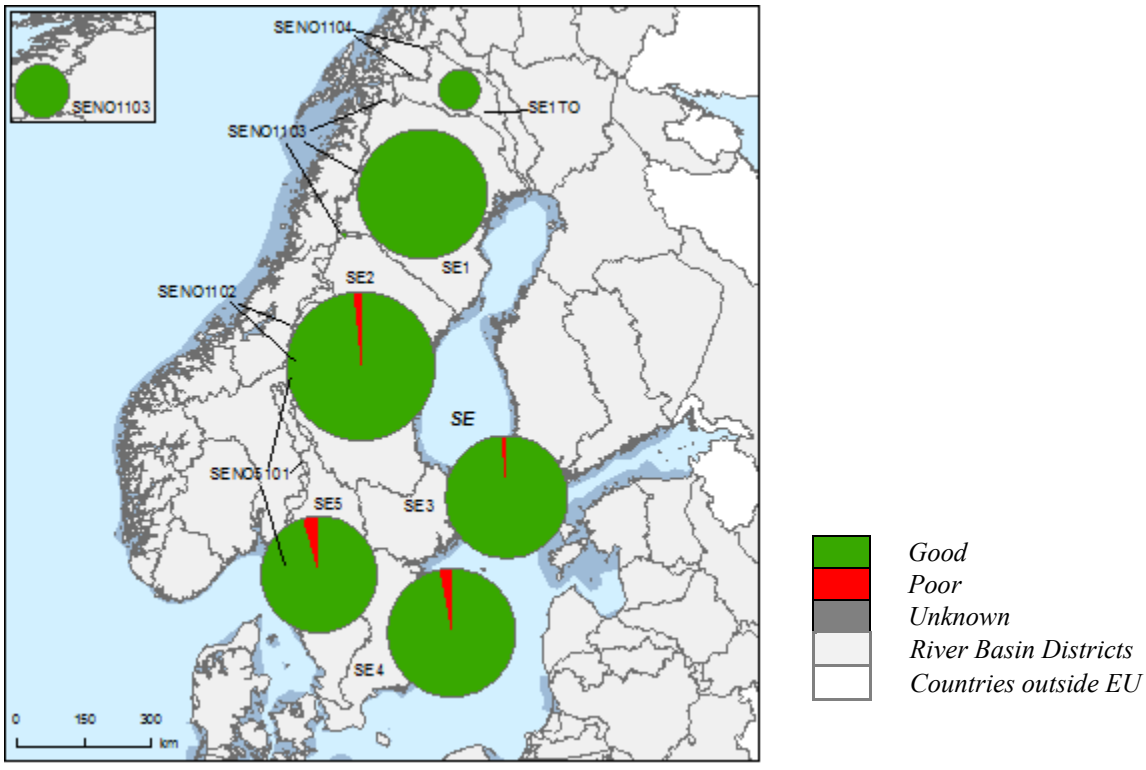


Figure 6.10: *Map of chemical status of groundwater bodies 2015*
Note: *Standard colours based on WFD Annex V, Article 2.4.5.*
Source: *WISE, Eurostat (country borders)*

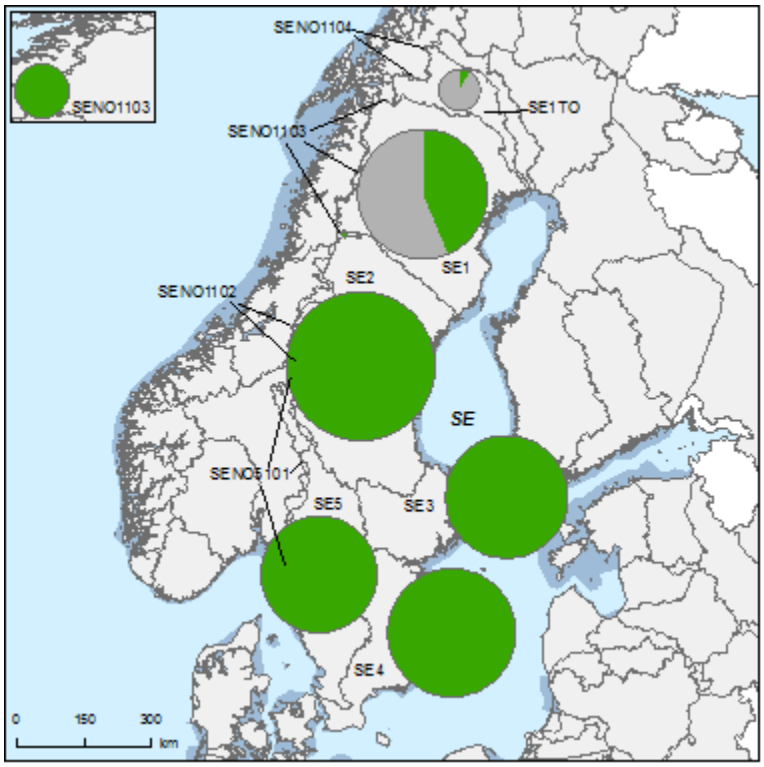


Figure 6.11: *Map of quantitative status of groundwater bodies 2009*
Note: *Standard colours based on WFD Annex V, Article 2.2.4.*
Source: *WISE, Eurostat (country borders)*

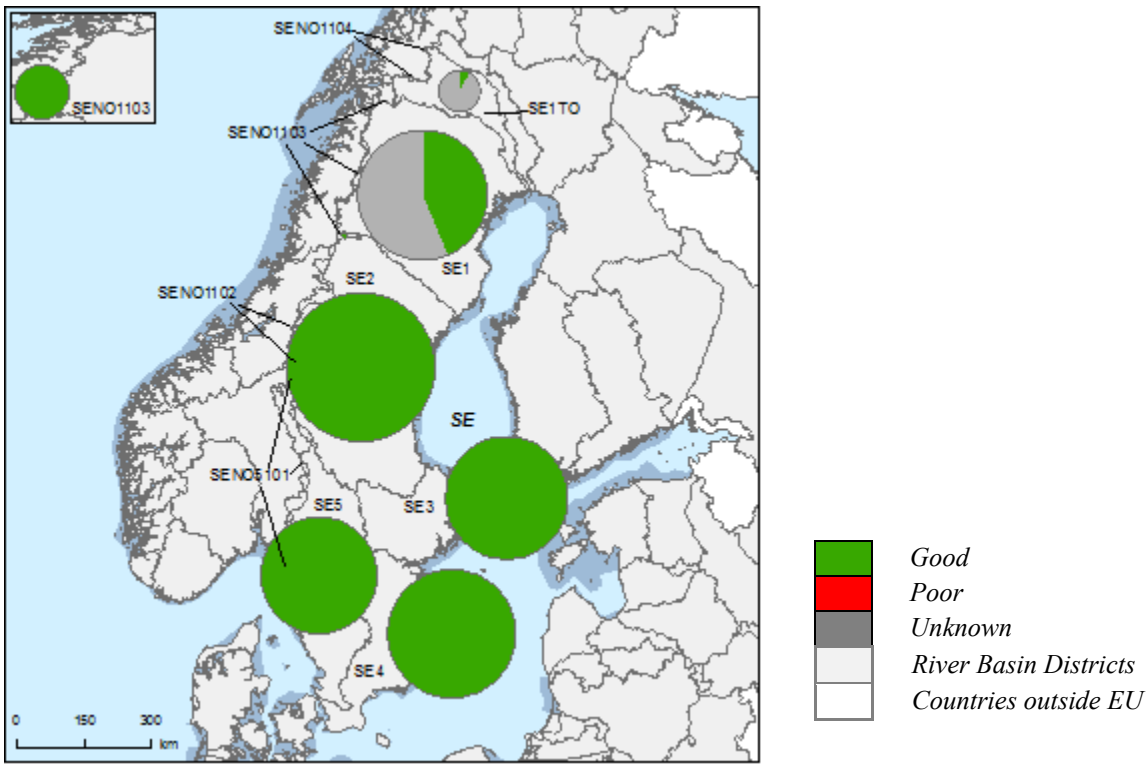


Figure 6.12: *Map of quantitative status of groundwater bodies 2015*
Note: *Standard colours based on WFD Annex V, Article 2.2.4.*
Source: *WISE, Eurostat (country borders)*

7. ASSESSMENT OF ECOLOGICAL STATUS OF SURFACE WATERS

Sweden has a national approach to assessment of ecological status. There have been some changes between the 2009 WFD implementation report and the reporting of the first RBMPs in 2010. Fewer BQEs are reported to be available now, compared to what was reported in 2007, when methods were only missing for phytoplankton in rivers. Minor adjustments were also reported concerning the class boundaries for phytoplankton bio-volume in lakes. Swedish authorities have clarified that further improvements and revisions of the Swedish classification system will be done based on the research project WATERS[18].

7.1 Ecological status assessment methods

Sweden had assessment methods for **most biological quality elements(BQEs)** already in 2009, where only the method for phytoplankton in rivers was reported to be missing.. The current situation based on the RBMPs and in the WISE reports is different.

[18] http://www.waters.gu.se/

RBD	Rivers							Lakes							Transitional							Coastal					
	Phytoplankton	Macrophytes	Phytobenthos	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macrophytes	Phytobenthos	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macroalgae	Angiosperms	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macroalgae	Angiosperms	Benthic invertebrates	Physico-Chemical	Hydromorphological
SE1															-	-	-	-	-	-	-						
SE2															-	-	-	-	-	-	-						
SE3																											
SE4																											
SE5																											

Table 7.1.1: *Availability of biological assessment methods*

Assessment methods fully developed for all BQEs

Assessment methods partially developed or under development for all or some BQEs

Assessment methods not developed for BQEs, no information provided on the assessment methods, unclear information provided

\- *Water category not relevant*

Source: *RBMPs and SE*

The tables based on the RBMP/WISE information and compliance assessment show that for rivers and for coastal waters in the Baltic Sea, the botanical BQEs are still under development or partially developed. The benthic invertebrates methods are fully developed in all the water categories, while fish methods are fully developed for rivers and lakes, but not for transitional waters. Some BQEs were missing: macrophytes in rivers and fish in transitional waters, as well as parts of other BQEs, e.g. abundance of macrophytes in lakes, non-diatoms in phytobenthos in rivers, taxonomic composition of phytoplankton, macroalgae and angiosperms in coastal and transitional waters. Swedish authorities have clarified as follows: There are assessment criteria for phytobenthos for lakes and rivers. For phytoplankton in rivers, only diatoms have proven to be a relevant environmental indicator for the pressure on phytoplankton in Swedish rivers. A method for macrophytes in rivers is said to be in development in dialogue with Norway and Finland. A method for fish in coastal waters may be possible to use in transitional waters, but few such waters have been designated.

The **hydromorphological** (HyMo) supporting QEs are also not fully developed in any water category, while the physico-chemical QEs are developed in some RBDs, but not in all.

The biological methods are said to be **able to detect the major pressures**, although hydromorphological pressures are not well covered with data.

Standards have been set for most physico-chemical QEs, but only for some HyMo QEs, but the standards do not seem to be well linked with the BQEs.

A national guidance document from 2008 lists EQS values for several **specific pollutants** and are stated to be developed following WFD requirements[19].

The **one-out-all-out principle** has been applied to derive the overall ecological status.

There is only theoretical guidance given on how to assess **uncertainty** in classification (related to proximity to class boundaries), but no information on which parts of the classification system may have higher or lower confidence linked to them. Apart from a warning to consider extreme weather events, such as floods/droughts if an assessment of status class for a water body is counter-intuitive, there is no information on how spatial and temporal variation is dealt with when assessing the status of a water body in practice. Grouping has been extensively applied for classification, and good guidance is given on how this should be done. The guidance is to use at least 3 sites with monitoring data in a group of water bodies, each with the same pressures and of the same type, but there is no information on whether this guidance has been used in practice.

Ecological status assessment methods are said to be developed for **all national surface water body types**, as all types are covered by the classification system for each BQE. However, this does not mean that all the different types have their type-specific reference conditions and class boundaries, but that many types are merged for different BQEs, and also models are used to estimate site-specific reference conditions.

[19] http://www.vattenmyndigheterna.se/SiteCollectionDocuments/sv/bottenviken/beslut-fp/status2009/NV_rapp5799_fororenande_amnen.pdf

The ecological quality ratios (EQR) values for all BQEs (or parts of these) that were inter-calibrated in phase 1 of the **inter-calibration(IC)** process are all consistent with the results reported in the IC technical reports for rivers, while for lakes the boundaries are consistent except for macrophytes, where the Swedish class boundaries are more stringent than those reported in the IC technical report. For coastal waters the national boundaries for angiosperms are less stringent (HG: 0.81 and GM: 0.61) than the IC boundaries (HG: 0.90 and GM: 0.74). For all BQEs and water categories there are problems with the translation from IC common types to national types. The translation of IC results has been applied to all national types, although it is unclear how this translation has been done, as the national types and IC types differ considerably. BQEs not inter-calibrated are phytobenthos, fish in lakes, and fish in transitional waters (no national method yet). Swedish authorities have clarified that the inter-calibration had not been completed by the time of adoption of the RBMPs, but that the process was due to finish at the end of 2011. Based on this, class-boundaries may be modified.

A **background document or national/regional guidance document** has been reported: Swedish guidance on assessment of ecological status: "Status, potential och kvalitetskrav för sjöar, vattendrag, kustvatten och vatten i övergångszon. Naturvardsverket Handbok 2007:4, Dec. 2007" http://www.naturvardsverket.se/Documents/publikationer/620-0147-6.pdf .

Swedish EPA's legal surface waters classification document: Naturvårdsverkets föreskrifter och allmänna råd om klassificering och miljökvalitetsnormer avseende ytvatten. NSF 2008:1, ISSN 1403-8234, which is available at:
http://www.naturvardsverket.se/Documents/foreskrifter/nfs2008/nfs_2008_01.pdf

7.2 Application of methods and ecological status results

Very few water bodies are monitored with all the relevant QEs for surveillance monitoring according to the information reported, for the rest of the river and lake water bodies classification is based on modelling. 30-40% of coastal and transitional waters are monitored. Swedish authorities have clarified that much more monitoring data are available and has been used for classification, than what has been reported.

Ecological status assessment does not include **specific chemical pollutants**, no list of pollutants was found. Swedish authorities have clarified that the analysis has not yet been completed as to which specific pollutants cause exceedance of good ecological status.

Operational monitoring is not done in transitional and coastal waters (although other monitoring is done, according to the Swedish authorities). For rivers and lakes the QEs are more or less the same as those used for surveillance monitoring, see above, and primarily address eutrophication and acidification. For eutrophication the very limited use of phytobenthos in rivers is quite serious, as that is usually the **most sensitive BQE** to that pressure.

Confidence class is given for each classified water body. For rivers and lakes more than 80% are classified with low **confidence**, while for transitional and coastal waters ca. 70% are

classified with low confidence. Less than 10% of all water bodies are classified with high confidence for all water categories[20].

[20] ref. EEA/ETC Thematic assessment of ecological status and pressures, figure 3.4

RBD	CAS Number	Substance	Percentage Water Bodies Failing Status (%)
SE1		Nutrients	4 % of surface water
SE2		Phosphorus	7 % for surface water
SE3		Phosphorus (eutrophication)	55 % for surface water
SE4		Phosphorus (eutrophication)	43
SE5		Pesticides	
SE5		Phosphorus	23

Table 7.3.1: *River basin specific pollutants causing failure of status*
Source: *RBMPs*

8. DESIGNATION OF HEAVILY MODIFIED WATER BODIES (HMWB) AND ASSESSMENT OF GOOD ECOLOGICAL POTENTIAL

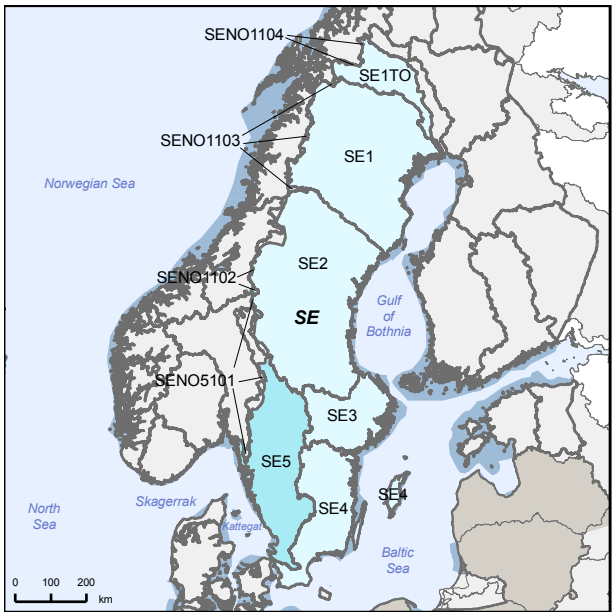


Figure 8.1: *Map of percentage Heavily Modified and Artificial waterbodies by River Basin District*

0 – 5 %
5 – 20 %
20 – 40 %
40 – 60%
60 – 100 %
No data reported
River Basin Districts
Countries outside EU

Source: *WISE, Eurostat (country borders)*

The provisional identification of HMWBs and AWBs was estimated at about. 8% of the total number of WB (according to the Article 5 report). No AWBs were provisionally identified; only HMWBs.

In the RBMPs 514 HMWBs and 13 AWB have been designated in the 5 main RBMPs representing 2% of the totally 23418 WBs in Sweden. Swedish authorities have clarified that the designation is not yet completed, partly due to a shortage of data and the need to develop methods, and that work is ongoing with other Nordic countries in relation to hydropower and HMWB designation.

8.1 Designation of HMWBs

The **water uses** for which the water bodies have been designated as HMWB are clearly stated; the two uses identified are hydropower and large ports/navigation. The **physical modifications** related to these uses are described related to hydropower in general: (weirs/dams/reservoirs/channelisation etc.) and related to ports (land reclamation/coastal modifications) The few ABWs are, however, classified as such without specification of designated uses. (ABWs are described as river plain areas channelised etc).

The **methodology for** the designation of HMWBs has been described, and it is based on expert judgement, does not completely followed the CIS Guidance 4 document. Steps 1-6 have been followed up to identification of provisional designation of HMWBs, but measures to identify GEP and assessment of the impact of such measures on the environment as a whole, are generally not identified. Measures are considered in general and in some RBMPs have been exemplified. A key criteria dominates in the designation of HMWBs linked to hydropower: Large hydro schemes with installation powers over 10MW that provide balance power. The importance of this use/service is considered to be of paramount importance. It is considered almost certain that the linked provisionally designated HMWBs will remain HMWBs after further analyses are performed during the ongoing second planning cycle. Also for many ports of national importance water bodies designated as HMWBs are assumed to remain HMWBs.

The Swedish Environmental Agency (Statens Naturvårdsverk) has issued a proposal on guidelines for designation of HMWB/AWB. It provides only overarching and general guidance for HMWV and/or AWB designation and is not approved as a national Swedish guidelines. It is unclear to what extent some of the proposed criteria have been used in the RBMPs in practice.

8.2 Methodology for setting good ecological potential (GEP)

GEP has been defined. However, in the first planning cycle a simplified approach has been used; only two classes are applied: Good Ecological Potential and Moderate Ecological Potential. These two classes are rather briefly and only qualitatively described.

> GEP: The ecological state achieved when no further measures improving the ecology are possible to implement without having considerable negative effect on the environment or on the actual activity/water use that led to the designation as HMWB or AWB. No further analyses are necessary to specify or study the impact of improvement measures.
>
> MEP: The ecological state achieved when mitigation measures are implemented which would not have considerable negative effect on the environment or on the actual activity/water use that led to the designation as HMWB or AWB.

The approach in the first planning is considered as an **alternative approach** with reference both to the reference-based, as well as to the mitigating measures approach (Prague approach).

Further analyses to specify and consider the impacts of mitigation measures related to the actual use and the environment as a whole are stated to be necessary and work is under way. The Water authorities are working with new guidelines on how to deal with HMWB, focusing on hydropower.

Background document : The basis for the further development of the designation of HMWBs and AWB and the methodology for setting GEP is The Swedish Environmental Agency guidelines from 2007 (- - reference). However the ongoing work in collaboration with the other Nordic countries is expected to provide new and operational guidelines on these issues.

8.3 Results of ecological potential assessment in HMWB and AWB

All HMWBs that have been classified are assessed as being in moderate ecological potential, while 85% of the AWBs that have been classified are assessed as being in good ecological potential. There are 32% HMWBs with unknown ecological potential (see table below).

Category	Modification	Total	% Less than good	% Unknown
All	HMWB	398	67.8	32.2
	AWB	13	15.4	0
	All	23418	43.5	0.5
Rivers	HMWB	127	30.7	69.3
	AWB	12	16.7	0
	All	14757	46.3	0.6
Lakes	HMWB	244	85.2	14.8
	AWB	1	0	0
	All	6870	39.5	0.5
Transitional	HMWB	4	100	0
	AWB	0	0	
	All	21	100	0
Coastal	HMWB	23	82.6	17.4
	AWB	0	0	
	All	599	81.8	0.7

Table 8.3.1: *Number s and status assessment of HMWB and AWB by water category*
Source: *WISE*

The ecological potential assessment in HMWB and AWBs are very generally described and not site specific.

9. ASSESSMENT OF CHEMICAL STATUS OF SURFACE WATERS

9.1 Methodological approach to the assessment

EQS standards of Annex I of the EQSD are the **basis for the assessment**. No national standards for Annex I substances have been derived.

It is not clear from the RBMP if all priority substances have been monitored and considered in the assessment of chemical status. Swedish authorities have clarified that all EQSD substances have been monitored apart from hexachlorobutadiene(HCBD) (see also information on screening above). Lack of monitoring of EQSD substances is explained by the fact that the EQSD came into force in 2008; one year after the Swedish monitoring programme of March 2007 was reported. Standards used are those in Annex I of the EQSD.

The EQS for mercury in **biota** are applied, but for hexachlorobenzene and hexachlorobutadiene, no results are shown. For sediments, no information is provided.

Background concentrations have not been considered in biota or water. For sediments, no values are reported in the RBMPs due to the fact that EQS values have not been derived for this matrix. In some cases bioavailability is taken into account in the assessment of compliance with the EQS for metals.

9.2 Substances causing exceedances

Sweden has reported that all water bodies have fair chemical status due to mercury. Sweden has provided further clarifications and information on the number of water bodies failing chemical status due to other pollutants than mercury :

- 63 lakes
- 69 river
- 4 transitional waters
- 73 coastal waters

CAS Number	Name of substances	% of water bodies failing good chemical status	Number of water bodies failing good chemical status[2]	Number of water bodies failing good chemical status[3]			
				Rivers	Lakes	Transitional	Coastal
7440-43-9	Cadmium and its compounds	NA[1]	126	46	40	0	40
104-40-5	Nonylphenol	NA	15	14	2	0	0
7439-92-1	Lead and its compounds	NA	47	13	11	0	29
7439-97-6	Mercury and its compounds	100	22180	all	all	all	All
7440-02-0	Nickel and its compounds	NA	14	4	0	0	11
608-93-5	Pentachlorobenzene	NA	1	1	0	0	0
32534-81-9	Brominated diphenylethers	NA	5	0	1	0	2
117-81-7	Di(2-ethylhexyl)phthalate (DEHP)	NA	1	No info	No info	No info	No info
91-20-3	Naphthalene	NA	1	([4])	([4])	([4])	([4])
206-44-0	Flouranthene	NA	14	4	7		3
18-74-1	Hexachlorobenzene	NA	5	1			4
87-68-3	Hexachlorobutadiene,	NA	1	1			
87-86-5	Pentachlorophenol	NA	3	1	3		
not given	Polyaromatic hydrocarbons	NA	14	3	14		10
36643-28-4	Tributyltin compounds	NA	34	5	34	4	20
140-66-9	Octylphenol	NA	2	2	2		
1912-24-9	Atrazine			2			
122-34-9	Simazine			2			
120-12-7	Anthracene			1			

Table 9.2.1: *List of priority substances causing a failure of chemical status, other than mercury*
[1] *NA, not available*
[2] *Taken from WISE*
[3] *Clarification form Swedish authorities*
[4] *Information only provided on priority substances.*
Note: *There are some differences between the two sets of data.*
Source: *WISE and Swedish authorities*

9.3 Other issues

The concept of **mixing zones**, defined as a part of a water body of surface water restricted to the proximity of the point of discharge within which the Competent Authority is prepared to accept EQS exceedance, has not been used in any of the RBMP.

10. ASSESSMENT OF GROUNDWATER STATUS

According to the RBMPs, the status of ground water (both quantity and quality) seems in general to be very good in Sweden with 98 % of the GWBs in good status. It should however be noted that several times in the RBMPs and other supporting documents, it is pointed out

that the knowledge about ground water status is limited, as only 4 % of all GWBs are monitored (expressed in e.g. RBMP for SE 5: Monitoring data is missing or insufficient for a great part of the GWBs).

The three main pressures to ground water status are point sources, diffuse sources and others (not defined).

10.1 Groundwater quantitative status

The RBMPs states that the data basis for the assessment (both regarding quantity and quality) is insufficient and that new information/data, methods etc. will be collected and developed during this, the second, RBMP cycle. The impact from **abstractions** and impacts on **groundwater dependent ecosystems** have therefore not been considered.

10.2 Groundwater chemical status

As groundwater monitoring data is insufficient in Sweden, expert judgement has been made based on available information and pressure analysis to decide if the threshold value is exceeded and the GWB is at risk.

A national approach has been used for the overall impact assessment. A GIS-analysis has been done including point sources (different plants, contaminated sites, roads, rail roads, sand and gravel extractions) and diffuse sources (e.g. farmed land, forest or urban areas). The method is indicative and does not identify the specific substances, but indicates the group of substances in question. The method has been used in the risk assessment to identify the groundwater bodies at risk and that need further investigation/monitoring.

The status assessment is based on exceedances of threshold values of chemical analyses. If no information is available, the GWB was, by presumption, placed in good status. Only for a very small part of the GWBs, was the assessment based on a solid data basis.

The substances considered for **threshold values (TV**) are laid down in a national regulation: Nitrate, pesticides (individual and total), chloride, conductivity, sulphate, ammonium, arsenic, cadmium, lead, mercury, tri- and tetra chloroethane, chloroform, dichloroethane, and 6 PAH's. The TV's for most of the substances are identical with the drinking water TV.

Background concentrations have been considered for 4 ions (chloride, sulphate, nitrate and ammonia), 10 metals (arsenic, lead, cadmium, cobalt, chromium, copper, mercury, nickel, vanadium, zinc) and for conductivity.

Trend assessment and reversals have not been performed in this planning cycle due to a limited chemical surveillance monitoring programme for ground water in Sweden.

10.3 Protected areas

All GWB's intended for drinking water abstraction are reported to be in at least good status.

RBD	Good	Failing to achieve good	Unknown
SE1	90		
SE1TO	11		
SE2	183		
SE3	171		
SE4	196		
SE5	205		
Total	*856*	*0*	*0*

Table 10.3.1: *Status of groundwater drinking water protected areas*
Source: *WISE*

11. ENVIRONMENTAL OBJECTIVES AND EXEMPTIONS

Environmental objectives are set for all water bodies, but time exemptions are applied for almost all water bodies at risk. Environmental objectives are established for 2015, 2021 and for some river basin districts and types of water bodies also for 2027. Water body specific information is provided in a separate document accompanying the RBMPs.

The RBMP describes environmental objectives for 2015 and 2021. Environmental objectives for 2027 are only described for a few river basin districts and types of water bodies. This is the reason for the low number of bodies described to be in good status in 2027.

For many water bodies, it has been difficult to assess the status because of inadequate data. In these cases, the status is described as good, but these bodies are simultaneously considered at risk of not achieving good status by 2021. For more information about operation of the risk assessments, see the Environmental Protection Agency's Guide to identification and analysis of surface water (2007:3).

11.1 Additional objectives in protected areas

There are additional objectives for protected areas explicitly identified for Natura 2000 areas. For protected areas related to drinking water and bathing water, it is, however, not clear from the RBMPs whether additional objectives (i.e. additional to good status) have been set in the RBMPs. Regarding shellfish waters, quality requirements have been set following the Directives on quality of freshwater to sustain fish and shellfish. These requirements are transposed in the Swedish regulation and apply where appropriate beyond the WFD requirements for surface water chemical status.

11.2 Exemptions according to Article 4(4) and 4(5)

Time exemptions to 2021 are explicit described by each water body, including and the reason for making these exemptions for chemical status. For ecological status such water body specific information is not provided.

There is an overall assessment of the **main impacts causing exemptions**. Exemptions and reasons for these are only explained in general, and there is no information about the uncertainty in setting environmental objectives. According to the WISE report, all exemptions described are due to technical feasibility except from exemptions related to chemical status for ground water bodies, where also natural conditions are stated as a reason. However, in the RBMP, there are some general statements that natural conditions can be a reason for making exemptions.

It is reported to WISE that no use is made of the **disproportionate costs** argument to justify exemptions. However, disproportionate costs are generally stated in the RBMPs as a reason for exemptions caused by eutrophication, physical changes and environmental toxins. The methodology to assess disproportionate costs is not explained. There are inconsistencies between the RBMPs and the WISE reporting, and Swedish authorities have clarified they will review its reporting processes.

Sweden has reported that 100% of surface water bodies are subject to **Article 4 (5),** exemptions due to pollution by mercury (lower environmental objectives). Given the large scale and the fact that the situation is almost exclusively the result of a combination of historical pollution, the pressure from sources beyond Sweden's control and the special natural conditions, Sweden's judgment is that there are no technically feasible or economically proportionate measures that could solve this problem in a foreseeable time frame. In light of this, the objective set was to ensure, as far as possible, that the situation does not deteriorate further, and to focus on measures that can help improve conditions in the long term (such as international negotiations and pressures to reduce global discharges of mercury).

RBD	Global[21]					
	Technical feasibility		Disproportionate costs		Natural conditions	
	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)
SE1	1814	5948	0	0	0	-
SE1TO	98	926	0	0	0	-
SE2	4062	10994	0	0	0	-
SE3	851	1130	0	0	0	-
SE4	826	1623	0	0	0	-
SE5	1311	2552	0	0	0	-
SENO1102	5	66	0	0	0	-
SENO1103	0	121	0	0	0	-
SENO1104	0	4	0	0	0	-
SENO5101	13	54	0	0	0	-
Total	*8980*	*23418*	*0*	*0*	*0*	-

[21] Exemptions are combined for ecological and chemical status.

Table 11.2.1: *Numbers of Article 4(4) and 4(5) exemptions*
Source: *WISE*

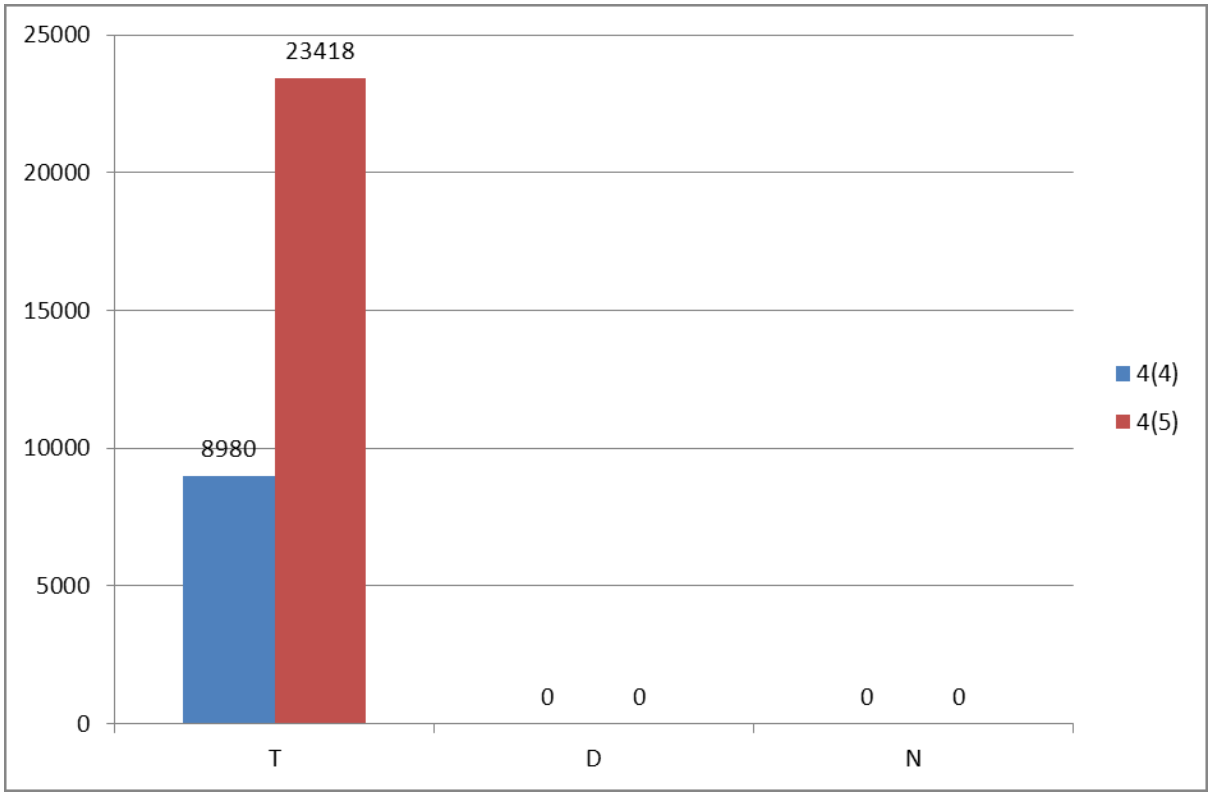


Figure 11.2.1: Numbers of Article 4(4) and 4(5) exemptions
T = Technical feasibility
D = Disproportionate costs
N = Natural conditions
Blue = Article 4(4) exemptions
Red = Article 4(5) exemptions
Source: *WISE*

11.3 Exemptions according to Article 4(6)

Exemptions according to Article 4(6) are not applied in Sweden.

11.4 Exemptions according to Article 4(7)

Exemptions according to Article 4(7) are not applied in Sweden.

11.5 Exemptions to Groundwater Directive

Exemptions under article 6 (GWD) have not been applied in Sweden.

All exemptions in relation to **chemical status** for ground water bodies are based on that it will be technically infeasible to achieve good status. Number of water bodies for each substance or group of substances in terms of chemical status to which the exemptions apply for each type of exemption in the RBD and its component sub-units are presented in the table below.

RBD	Exemption	Article4 4 Technical feasibility	Article4 4 Disproportionate cost	Article4 4 Natural conditions	Article4 5 Technical feasibility	Article4 5 Disproportio-nate cost
SE1	2 Pesticides	1	0	0	0	0
	3.6 Chloride	1	0	0	0	0
SE2	2 Pesticides	9	0	0	0	0
	3.1 Arsenic	3	0	0	0	0
	3.2 Cadmium	5	0	0	0	0
	3.3 Lead	5	0	0	0	0
	3.4 Mercury	4	0	0	0	0
	3.6 Chloride	1	0	0	0	0
SE3	2 Pesticides	6	0	0	0	0
	3.6 Chloride	3	0	0	0	0
	3.10 Conductivity	1	0	0	0	0
SE4	1 Nitrates	1	0	0	0	0
	2 Pesticides	10	0	0	0	0
	3.1 Arsenic	7	0	0	0	0
	3.2 Cadmium	2	0	0	0	0
	3.3 Lead	3	0	0	0	0
	3.6 Chloride	4	0	0	0	0
SE5	1 Nitrates	1	0	0	0	0
	2 Pesticides	16	0	0	0	0
	3.1 Arsenic	1	0	0	0	0
	3.2 Cadmium	1	0	0	0	0
	3.3 Lead	1	0	0	0	0

Table 11.5.1: *Use of exemptions for ground water chemical status*
Source:*WISE*

No exemptions to the achievement of the objectives of groundwater Article 7 Drinking Water Protected Areas have been reported.

12. PROGRAMMES OF MEASURES

According to Annex VII of the WFD, the RBMPs should contain a summary of the programmes of measures (PoM), including the ways in which Member States expect to achieve the objectives of Article 4 WFD. The programmes should have been established by 2009, but are required to become operational only by December 2012. The assessment in this section is based on the PoM as summarised by the Member State in its RBMP, and the compliance of this with the requirements of Article 11 and Annex VII of the WFD.

It therefore does not include a comprehensive assessment of compliance with the requirements of Article 11(3)[22] on basic measures. It focuses in particular on key sets of measures. Member States will report to the Commission by December 2012 on the full implementation of their PoMs, including on the progress on the implementation of basic measures as required by Article 11(3). The Commission will assess what Member States report and will publish its assessment in accordance with Article 18 WFD.

12.1 Programme of measures – general

The programmes lack information on which specific measures will be implemented for which water bodies, and therefore, also, at which pressures the measures are targeted. It is mentioned in some of the RBMPs, that models are used for different parts of the "chain" and for different types of pressures (nutrients, acidification etc.). The majority of "measures" proposed in the programme of measures, are of an "administrative nature" whereby other authorities are requested to collect further information and to identify measures that are cost effective at a local level. A list of 38 such "type measures" or "administrative instructions" are listed in the start of the PoM, and for each of the identified pressures, these "measures" are selected. As an example to reduce eutrophication, after a description of the extent of the problem and the target reduction, such administrative instructions are given for agriculture, industry and communal wastewater treatment, properties not connected to waste water treatment, surface water run-off, and forestry. For each instruction, examples of possible measures are also given.

The first of the 38 measures then refers to "återrapportering" or "reporting back", whereby all the authorities targeted by these measures have to provide progress reports back to the River basin authorities by the 28 February each year.

Although the link between the status assessments, the "need" for improvement (i.e. the specific reduced load) is said to be done, it is also clearly stated in the plan that further information on the status is currently insufficient to identify specific measures. This should also be seen in the context of the Swedish data basis, as the monitoring in SE used for the first RBMPs was mainly based on the old programmes ("business as usual").

In one RBD – SE2 – non-binding supporting documents for individual basins have been provided. In these the link becomes clearer at least for some water bodies, as a specification of (e.g. hydromorphological measures) or an account for the required improvement has been established (e.g. a certain reduction of phosphorus is needed to obtain the objective), and the reduction is divided on different measures (wetlands, catch crops, waste water treatment (agglomerations and single houses) etc.). Since these sub-district plans were not officially reported, these have not been further assessed.

The PoM's have not been subject to **international coordination** with the two neighbouring countries (i.e. Finland and Norway). One chapter in SE 1 describes a few common measures (verifying the status for the common marine area (lack of data), harmonization of chemical status concentration of mercury, harmonization of the timetable) with Finland for the trans-

[22] These are the minimum requirements to be complied with and include the measures required under other Community legislation as well as measures to achieve the requirements of other WFD Articles and to ensure appropriate controls on different activities affecting water management

boundary River Torne. Besides these few common measures, the Swedish plan for SE 1 contains a number of measures for the Swedish part of this IRBD.

The **general scope of the application of measures** is divided between a national scale (agencies etc), on RBD level and on water body level. The main **authorities** responsible for the implementation are authorities at the national level, and a big role is played by regions and the municipalities. It should be noted, that a large number of institutions are involved, making the administrative set-up difficult to overview and to some extend not transparent.

Based on the assessment above, it is not clear from the RBMPs how a common goal (e.g. a certain reduction in phosphorus from different sources and with different responsible authorities) is going to be obtained.

The unclear nature of the PoM was also an issue during the public consultation in Sweden. In for example, the summary from the consultation of the PoM for SE5, one of the main remarks is the unclear nature of the PoM. It is stated in the summary of the public consultation, that "the authorities and the municipalities find it difficult to link their responsibility for the measures to the proper water body and the type of pressure". The answer from the Water Authority to these remarks from other authorities is that the government will find opportunities to revise the PoM before 2015 or prepare "sub-PoM" within 2 years (i.e. before the end of 2011) with more precise measures for selected areas.

The mainly administrative approach with numerous players for the Swedish PoMs makes it also difficult to see, how, by whom and to what extend a specific reduction is going to be implemented.

The **cost of measures** related to the RBMPs is available in the plans and also divided between sectors and pressures (the costs are presented according to pressures).

Pressure	Mio. €	Comments
Diffuse sources (nutrients)	179-316	Administrative costs included in point sources
Point sources (nutrients)	675-1065	
Hazardous substances	141-225	
Water abstraction	16	Only SE2
Art. recharge	0	
Morphological alternations	188-217	
Other	123-166	Acidification, drinking water protection.
Total	1625-2546	

Table 12.1.1: *Cost estimates from RBMP 2009-15*
Note: *The mean of the figures differ from the WISE report (aggregated for 6 years it is app. 1700 mio. €).Costs in the RMBP's are presented as yearly costs. It is assumed, that the period is 6 years.*
Source: *RBMPs*

The costs are divided between basic (art. 11b-l) and supplementary measures only in two RBMP (and in WISE). For these two, the costs for the basic measures are approximately. 75% of the total. In WISE, the proportion of basic measures is approximately. 89%. Nearly 60% of the measures in the national catalogue of measures are referred to in WISE as basic measures. It should once more be stressed, that the majority of the measures in the catalogue are of an administrative character. The Swedish presentation in the RBMPs of the costs divided on different sectors or pressures is very good and in general clear and could be a

good example for other countries, however this comment needs to be seen in the context of the criticism of the nature of the types of measures. It has not been possible to find a clear indication of a financial commitment to fully implement the PoM.

The **timeline for the implementation** of the measures is unclear. In the PoM's it is stated, that it is required that the authorities and the municipalities have approved the measures according to the PoM before 22. December 2012. Later on in the PoM it is noted, that it is not required that the measures are fully operational by 22. December 2012. In WISE it is reported, that the calculated cost is for the measures assumed necessary to take until 2015.

12.2 Measures related to agriculture

In the southern RBD (SE 3, 4 and 5), agriculture has been identified as a **major pressure** for diffuse loading of nutrients (up to 50 %). For hydromorphology, agriculture is mentioned as a major pressure in line with forestry. Pesticides (obsolete or currently in use) are also mentioned as a factor affecting water bodies. Abstraction by the agriculture sector does not seem to be a significant pressure.

It is not specifically referred in the RBMPs, that agricultural measures have been discussed and agreed with the agricultural sector - except for the **public consultation** of the PoM.

Reduced fertiliser application is indicated in Southern Sweden (SE 4 and 5), while measures to reduce soil erosion and also hydromorphological measures are planned for all or most of the RBDs. Many non-technical (administrative) measures have also been selected, including controls, codes of agricultural practices, advice and training.

The general statements in the section above, as regards scope and nature of the measures, timing and follow-up also apply to the agriculture section.

Information about financial sources for the implementation of agricultural measures is limited, but the Rural Development programme is mentioned as a source for financing in some RBMP without any indication of the proportion.

Measures	SE1	SE2	SE3	SE4	SE5
Technical measures					
Reduction/modification of fertiliser application				✓	✓
Reduction/modification of pesticide application					
Change to low-input farming (e.g. organic farming practices)					
Hydromorphological measures leading to changes in farming practices	✓		✓	✓	✓
Measures against soil erosion	✓	✓	✓		✓
Multi-objective measures (e.g. crop rotation, creation of enhanced buffer zones/wetlands or floodplain management)			✓	✓	✓
Technical measures for water saving					
Economic instruments					
Compensation for land cover					
Co-operative agreements					
Water pricing specifications for irrigators					
Nutrient trading					
Fertiliser taxation					

Measures	SE1	SE2	SE3	SE4	SE5
Non-technical measures					
Additions regarding the implementation and enforcement of existing EU legislation					
Institutional changes					
Codes of agricultural practice	✓			✓	✓
Farm advice and training	✓	✓	✓	✓	✓
Raising awareness of farmers					
Measures to increase knowledge for improved decision-making			✓	✓	✓
Certification schemes					
Zoning (e.g. designating land use based on GIS maps)					
Specific action plans/programmes					
Land use planning					
Technical standards					
Specific projects related to agriculture					
Environmental permitting and licensing					

Table 12.2.1: *Types of WFD measures addressing agricultural pressures, as described in the PoM*
Source: *RBMPs*

12.3 Measures related to hydromorphology

Due to the status of the measure as described above, it is not possible to assess if the measures are **appropriate**. The **effects** of the proposed measures are mainly an improved basis for decisions upon specific measures to be taken in the next planning cycle. In some of the PoM, a short list of effects of the measures is available, e.g. for SE 2 and 3 (examples)

- Improved basis showing the extend and impact of physical alternations
- Develop a guideline for the controlling authority
- A strategy and a plan for revising permits
- Mapping of and measures taken in relation to road and rail road under passes
- The municipalities have developed their overview and detailed planning so the EQS will be obtained
- A basis for prioritizing the most valuable cultural water environments and plants (old water mills etc.)
- Maintain or establish wooded zones along rivers

The set-up for HMWBs does not differ from the above, so specific measures in relation to HMWB are not described and identified in the PoM

The measures related to HMWB are also mainly of an administrative character. A set of parameters has been included in some of the RBMP's to assess the if a specific water body is substantially impacted by changes in flow

- Degree of regulation > 10 %
- Change in max. mean flow > 5 %
- Change in minimum mean flow > 10 %
- Regulation amplitude > 1 m

Measures	SE1	SE2	SE3	SE4	SE5
Fish ladders					
Bypass channels	✓				
Habitat restoration, building spawning and breeding areas		✓	✓	✓	
Sediment/debris management					
Removal of structures: weirs, barriers, bank reinforcement	✓		✓	✓	✓
Reconnection of meander bends or side arms					
Lowering of river banks					
Restoration of bank structure					
Setting minimum ecological flow requirements			✓		
Operational modifications for hydropeaking				✓	
Inundation of flood plains					
Construction of retention basins				✓	
Reduction or modification of dredging					
Restoration of degraded bed structure					
Remeandering of formerly straightened water courses				✓	

Table 12.3.1: *Types of WFD measures addressing hydromorphological pressures, as described in the PoM*
Source: *RBMPs*

12.4 Measures related to groundwater

As the **status** of groundwater bodies (GWB) in general is considered good and that very few GWBs are at risk of not obtaining good quantitative status., measures for tackling groundwater pollution are in a very general level, not targeted to groundwater bodies.

Measures linked to quantitative status are administrative measures as well as supplementary measures like data collection, monitoring, planning, statistics etc.

Measures to prevent and limit pollution are listed, but they are very general and not targeted at specific physical actions to be taken. Their presentation is unclear (e.g. overlaps, no distinction between surface and groundwater). Supplementary measures are mentioned like data collection, monitoring, planning, statistics etc.

There is no information on international co-ordination of measures.

12.5 Measures related to chemical pollution

Given that Mercury is described as the main problem in Sweden causing all surface water bodies to fail to attain good chemical status, and the main source for this pollution is stated to be atmospheric deposition from other countries, no measures are included to reduce the atmospheric input of mercury. Domestic sources for mercury (e.g. rehabilitation of old contaminated sites) may be included in some administrative measures, but this is not specifically noted.

Although other priority substances and other hazardous substances/other pollutants and sources are mentioned in different documents and contexts, the description is mainly general and a specific **inventory** linking sources and substances has not been found in the available documents (reference to databases for contaminated sites and point sources). Models (e.g. GIS analysis, not described in detail) have been used as an indicative tool for detecting pollution with hazardous substances.

The **main measures** taken regarding chemical pollution are in line with other areas administrative like verification of chemical and ecological status, steering tools, advisory and educational activities for farmers. The competent authorities for rehabilitation of contaminated sites are obliged to prioritize areas in the catchment of water bodies not reaching good chemical status. The measures are not substance specific.

12.6 Measures related to Article 9 (water pricing policies)

Only water supply and wastewater are included as **water services** for the purpose of Article 9. It is not clear if self-services are included, such as individual households/properties not connected to communal waste water treatment or water supply services. The Swedish definition of water services includes the services of Swedish law that together constitute water supply and collection and treatment of sewage. The act (2006:412) defines:

- Water supply: the supply of water which is suitable for normal household use.
- Collection and treatment of sewage: remove leading storm surface water and drain water from an area with comprehensive settlement or from a cemetery, the disposal of sewage or the disposal of water used for cooling.

Sweden does not include the following water services: water abstraction for cooling industrial installations and agricultural irrigation, the impoundment or storage of surface waters for navigation purposes, flood protection, hydro power production nor well drilling for agricultural, industrial or private consumption.

The Government defines water use as "water services together with all other activities under Article 5 and Annex II having a significant impact on water status ". Abstraction, agriculture, industry, households, hydropower, irrigation, wastewater treatment, diffuse pollution from agriculture, point source pollution from domestic users, water supply and point source pollution from industry are all defined as water uses.

Cost recovery is calculated for water services as Sweden defines them, for water supply and collection and treatment of sewage. According to statistics from Swedish Waters, the overall water and sewage fee covers 99% of the costs for the whole country. The rest is covered by

taxes. The contribution to cost recovery of water services is not disaggregated into different water uses (at least households, agriculture and industry), which is not in line with WDF and makes cross-subsidies among different sectors invisible.

Financial costs as capital costs, operating costs, maintenance costs and administrative costs are included into cost recovery calculations. **Environmental and resource costs** are not included in the calculations due to a lack of an all-encompassing method or cost calculation for environment and resource costs in Sweden. Environmental costs can be considered in some ways as internalised trough charges as they are covered by the measures imposed on the operator in connection with regulatory or licensing under the Environmental Code. Since agricultural activities use municipal water, the environmental costs are covered in the same way as for households, or through the actions required in connection with regulation or licensing under the Environmental Code. The same principles of cost recovery for water services are also applied on the industrial activities.

The Environmental Code **makes reference to** the **polluter pays principle.** This particularly applies to the industrial sector, and for households, while the agricultural sector cost recovery is low. The Swedish law gives the opportunity to differentiate taxes for different activities that generate wastewater, and it is common to have special fee arrangements between individual sewage treatment plants and industrial operators whose wastewater is expected to have a higher degree of pollution than “normal” characteristics of wastewater. This avoids a situation with a risk of "cross subsidies" when the treatment of industrial wastewater is partly funded by contributions from fees from groups with “normal” wastewater. The polluter pays principle can in theory be achieved for all these sectors, but this is not fully developed today. In order to achieve full cost recovery for the water supply and wastewater sector, the water and sewage fee needs to be adjusted to a level which is also equivalent to the environmental cost visible in terms of the environmental impact. For this to be done, methods need to be evolved to evaluate a deteriorated environment.

Incentive pricing is reflected in the Water Services Act, where the charge for water services has been divided into a fixed part related to water and wastewater plant operations, and a variable component linked to the user's water consumption (metering and volumetric charging). In order to achieve full cost recovery for the water supply and wastewater sector, it is stated that the water and sewage fee needs to be adjusted to a level which is also equivalent to the environmental cost visible in terms of the environmental impact. For this to be done, it is explained that there is a need for methods to be evolved to evaluate a deteriorated environment.

There is no information in the RBMP or WISE summary report about any use of the provisions on flexibility in Article 9.4.

Sweden RBMPs have a common definition of water uses and water services, a common presentation of existing water prices and common approach to cost recovery calculation. Article 9 descriptions in the RBMP and WISE summary report are almost always only done at the national level. The cost recovery calculations are, however, made at the RBD level.

12.7 Additional measures in protected areas

The RBMP does not clearly identify the protected areas, which will not reach the more stringent objectives according to other directives.. On the other hand, it is stated in the

RBMPs, that the PoM should also cover the needs for improvement in protected areas – indicating that the measures to be taken should also ensure the fulfilment of the more stringent objectives related to other directives.

In SE 5 it is stated that the favourable conservation status for NATURA 2000 areas have not been used as a more stringent objective in the RBMP's, as the status assessment regarding NATURA 2000 areas has not yet been quality assured. It is mentioned, that the line between good and poor ecological status according to the RBMP usually is a good indicator for a favourable conservation status too.

Regarding the protection of **drinking water,** a number of administrative measures to support the basic measures are mentioned in the RBMP's, but not defined as supplementary or additional. Examples are collection and storage of information, monitoring, planning, statistics etc.

13. WATER SCARCITY AND DROUGHTS, FLOOD RISK MANAGEMENT AND CLIMATE CHANGE ADAPTATION

13.1 Water Scarcity and Droughts

WS&D are not considered a major relevant problem in Sweden. Water scarcity occurs occasionally in dry summers, particularly in Southern Sweden (e.g. Gotland, Halland), but only a very small proportion of water bodies are thought to be affected. The problem may however be underestimated due to lack of data and knowledge. Droughts are not specifically mentioned. The causes for water scarcity during dry summer periods are primarily water abstraction for irrigation and for domestic water supply. The impacts mentioned are especially enhanced risk of salt water intrusion into groundwater bodies in coastal areas. Water availability and needs for water abstraction are considered so far when planning new urban settlements in coastal areas, but not in the context of WFD. Sector policies are not linked to impacts on water scarcity due to insufficient data and knowledge.

Data on water abstraction for public water supply are collected by the water works and compiled in a database hosted by the Swedish Geological Survey. Data are not available on water abstraction for irrigation and for industrial- and domestic water supply not connected to public water works. Models for water recharge of groundwater bodies are developed, as well as for estimating the risk of salt water intrusion to groundwater bodies.

More monitoring and research is needed to increase the amount and quality of data and to improve the basis for other **measures.** A register for groundwater abstraction is needed. More knowledge is needed on groundwater-dependent ecosystems, especially among regional authorities. The current water supply law is considered sufficient to ensure efficient water use. More economic data are needed to estimate cost-recovery for water services for all sectors. Better planning is needed to estimate water needs and availability, especially when planning new settlements in coastal areas of Southern Sweden. Enhanced metering of water consumption in all sectors are needed to get a better overview of water abstraction.

No information is given on international coordination in relation to Water scarcity and droughts.

13.2 Flood Risk Management

Future scenarios indicate increased risk of intensive rain episodes and flooding in Sweden, causing deterioration of water quality through increased loads of nutrients, humic substances (browning of water), and pathogens from sewage overflows, demanding improved water purification in public water works and better sewage system capacity. Higher costs for production of drinking water and sanitation are expected.

Floods are not given as a reason for HMWB designation. For a few AWBs, channelisation of river plain areas is mentioned as a reason for designation.

No information is provided on floods related to art 4.6.

No information is provided on floods related to art 4.7.

No information is provided on flood risk reduction measures in the RBMP.

More intensive flooding due to climate change is referred to in the plans.

The need for linking the WFD and Floods Directive in the future RBMPs are explicitly mentioned in the current RBMPs.

13.3 Adaptation to Climate Change

Climate change is included in the plans to a limited extent, mainly as expected scenarios: These are wetter winters and drier summers, more intensive rain episodes and flooding, and consecutive negative impacts on water quality due to increased loads of pathogens, nutrients and humic substances, more saline intrusion in groundwater in coastal areas (combination of drier summers and increased water abstraction), loss of arctic char and other cold-water adapted species of fish and invertebrates, invasions of warm-water species, more use of pesticides. Impacts expected are enhanced costs for water services.

Recommendations on climate change adaptation from a recent Nordic conference are available for local/municipal planning authorities, and references are made to the national Climate and Vulnerability assessment.

No explicit climate check has been done for the PoMs, but this is mentioned in relation to the next cycle of RBMPs.

There are no specific climate change adaptation measures included in the plans other than plans for improved monitoring and research.

Improved monitoring and research are needed to provide better predictions as a basis for adaptation measures, for example, the risks of temperature increases, extreme flow and flood risks and how these interact with human activities affecting water quantity and quality. Better metering of water abstraction is also mentioned. More use of safeguard zones in catchments of raw water sources used for drinking water production, as well as a revision of water supply and sanitation plans.

14. RECOMMENDATIONS

Following the steps of river basin planning as set out in the WFD should ensure that water management is based on a better understanding of the main risks and pressures in a river basin and as a result, interventions are cost effective and ensure the long term sustainable supply of water for people, business and nature.

To deliver successful water management requires linking these different steps. Information on **pressures** and risks should feed into the development of **monitoring programmes**, information from the monitoring programmes and the **economic analysis** should lead to the identification of **cost effective programmes of measures** and justifications for exemptions. **Transparency** on this whole process within a clear governance structure will encourage **public participation** in both the development and delivery of necessary measures to deliver sustainable water management.

To complete the 1st river basin management cycle, and in preparing for the second cycle of the WFD, it is recommended that:

- Where there are currently high uncertainties in the characterisation of the RBDs, identification of pressures, and assessment of status, these need to be addressed in the current cycle, to ensure that adequate measures can be put in place before the next cycle.

- Sweden needs to complete the initial characterisation, to enable the establishment of WFD compliant monitoring networks. It is important to complete this first stage of the WFD implementation process to ensure cost effective implementation of subsequent steps.

- Sweden needs to lower its minimum size threshold for lakes to ensure all relevant water bodies are included.

- A large majority of water bodies are classified without monitoring data, giving low confidence in the classification. Very few water bodies are monitored with BQEs. Sweden needs to improve its classification system for ecological status, since it has several gaps.

- The described monitoring programme is not designed to be WFD compliant, but is a continuation of previous monitoring programmes (e.g. operational monitoring for ground water bodies is missing and no or very few sites are monitored for botanical BQEs and HyMo QEs in both surveillance and operational mode). The RBMPs need for instance to be more transparent regarding which priority substances are monitored. The justifications for not monitoring certain quality elements are not adequate. Improvement of the monitoring programme to make it fully WFD compliant is ongoing and is planned to be ready by 2012.

- The identification of river basin specific pollutants needs to be completed in all RBDs, and made more transparent, with clear information on how pollutants were selected, how and where they were monitored, how EQS was established, where there

are exceedances and how such exceedances have been taken into account in the assessment of ecological status. It is important that there is an ambitious approach to combatting chemical pollution and that adequate measures are put in place.

- The designation of HMWBs should comply with all the requirements of Article 4(3). The procedure for designation of HMWB has not been followed. Water bodies exposed to major HyMo pressures like large hydro power installations and harbours have been designated as HMWB/AWB, whereas water bodies exposed to other HyMo pressures have only been designated as candidates for HMWB/AWB. The designations of the latter will be decided for the next planning cycle. The HMWB designation process therefore needs to be completed before the next cycle. The assessment of significant adverse effects to the environment and the lack of significantly better environmental options should be specifically mentioned in the RBMPs. This is needed to ensure transparency of the designation process.

- Measures for defining GEP has furthermore not been defined for each individual HMWB/AW - only general descriptions are provided of the possible measures.

- The apparent omission of data on hexachlorobenzene and hexachlorobutadiene should be checked. The requirement for trend monitoring of several priority substances in sediment or biota as specified in EQSD Article 3(3) will need to be reflected in the next RBMPs.
- The knowledge base on groundwater should significantly be improved in Sweden. Enhanced and robust groundwater monitoring should be established based on WFD requirements. WFD based methodologies should be used to assess groundwater status correctly. Water body specific measures should be considered in the PoMs.

- Article 6 GWD exemptions can only be used if efficient groundwater monitoring is established (Art 6.3 GWD).

- There is no clear link between status assessment and the need for pressure reduction (nutrients, chemical pollutants and hydromorphology) and measures. Many of the measures are "administrative" (new investigations, monitoring etc).

- A significant number of exemptions have been applied in this first cycle of RBMPs. Environmental objectives are set for all water bodies, but time exemptions are applied for almost all water bodies at risk, indicating a low ambition level to meet the WFD good status environmental objective, although for chemical status the exemptions are due to long-range mercury pollution that takes a long time to change. The high number of exemptions applied in these first RBMPs is a cause of concern. Sweden should take all necessary measures to bring down the number of exemptions for the next cycle, including the needed improvements in the characterisation process, monitoring networks and status assessment methods, as well as reducing significantly the degree of uncertainties.

- Where article 4(5) is used – that is setting less stringent environmental objectives, such other objectives need to be transparently applied, and they need to go beyond repeating other already binding requirements such as no further deterioration.

- The use of exemptions under Article 4(7) should be based on a thorough assessment of all the steps as requested by the WFD, in particular an assessment of whether the project is of overriding public interest and whether the benefits to society outweigh the environmental degradation, and regarding the absence of alternatives that would be a better environmental option. Furthermore, these projects may only be carried out when all possible measures are taken to mitigate the adverse impact on the status of the water. All conditions for the application of Article 4(7) in individual projects must be included and justified in the RBMPs as early in the project planning as possible.

- Sweden needs to improve its programme of measures to be more explicit on the specific measures that are being planned, to enable a transparent planning tool showing how the environmental objectives can be met in a coordinated manner across the RBDs. Meaningful information regarding the scope, the timing and the funding of the measures should be included in the programme of measures so the approach to achieve the objectives is clear.

- It is recommended that the more detailed sub-basin plans are reported as formal parts of the RBMPs and formally reported to the Commission and made available to the public, as they include important supplementary information.
- The cost-recovery should address a broad range of water services, including impoundments, abstraction, storage, treatment and distribution of surface waters, and collection, treatment and discharge of waste water, also when they are "self-services", for instance self-abstraction for agriculture to collection and discharge of waste water, from scattered settlements, for which for instance environmental and resource costs also need to be recovered. The cost recovery should be transparently presented for all relevant user sectors, and environment and resource costs should be included in the costs recovered. Information should also be provided on the incentive function of water pricing for all water services, with the aim of ensuring an efficient use of water. Information on how the polluter pays principle has been taken into account should be provided in the RBMPs.

- Sweden needs to ensure full co-operation with neighbouring countries, including the correct designation of trans-boundary river basin districts and co-operation on measures to ensure achievement of the environmental objectives.