Annika K. Nilsson

Regulating Zero Eutrophication

Swedish Law on Controlling Emissions of Nutrients to the Baltic Sea

Country study report within the research project Legal Approaches to Controlling Emissions of Nutrients in the Baltic Sea Region – a Comparative Study of National Laws. The research project is conducted at the Faculty of Law, Stockholm University 2012-2013.

Abstract
Marine environment is well established on the Swedish political agenda. The government's "new generation of marine policy" aims for sustainable use of the resources of the sea and coastal areas, ecosystem preservation and restoration, as well as development and growth of business related to the sea. The EU marine policy is held as point of departure, but emphasises the need for action on the national level, taking the necessary measures to implement the relevant international agreements. The threat against Baltic Sea environment and eutrophication has long been recognised as an important and acute challenge, and so has the need for strong policy and measures to abate the problems. It has nevertheless proven challenging to achieve appropriate management and regulation.

Sweden is one of the main contributors of nutrient pollution to the Baltic Sea, with about 19 % of the nitrogen load, and 13 % of the phosphorous load. The main sources are agriculture, industry and municipal wastewater treatment plants. A wide range of measures have been taken to reduce the output, which has led to some, but far too little reduction in the anthropogenic loads. It is argued that fulfilment of the BSAP reduction targets is far away.

Swedish environmental law is based in the Environmental Code system, comprising a comprehensive code and a very substantial amount of subsidiary legislation and government recommendations, and implementing the relevant international law quite well. To a large extent, Swedish environmental law, also in the here topical matters, is focused on specific and individual regulation of substantive standards of care – emission limits, technical standards, etc. – are regulated via principles and general rules of care and balancing of interests, etc., to be specified in the individual case, for the individual activity and in its relevant environment, through permit decisions or regulatory orders or other individual administrative decisions.

This investigation shows example of extensive Swedish regulation of nutrients pollution from sewerage and agriculture, but at the same time reports of little improvement of the eutrophication problems of the Baltic Sea region. The water and marine environment management systems are aimed at taking a comprehensive and holistic view at managing water environment through an ecosystems approach – adaptive and flexible management, including regulatory management, based on relevant knowledge and information on the status and functions of the relevant ecosystems, and with involvement of a wide range of stakeholders. It has been shown that the institutional structure of such systematic and ecosystems based management has been established, and that the knowledge base is being built up, but that its realisation in concrete management work is still uncertain. Even though the management system objectives, norms, plans and programmes comprise a good basis for operative regulation and other concrete management measures, their actual application and realisation is not very clearly and specifically directed or controlled. The linking between marine environment and concrete management measures is even weaker. Ecosystems management of marine environment, specifically with the aim of abating eutrophication, is therefore quite established on a strategic level, but its realisation in actual regulatory management work is still not clearly established in the Swedish environmental management systems.

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Stockholm University
SE-106 90 Stockholm
Sweden

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Introducing the Research Project

Legal Approaches to Controlling Emissions of Nutrients in the Baltic Sea Region

In January 2012 a research project about legal approaches to controlling nutrient emissions to the Baltic was launched at the Faculty of Law of Stockholm University. The project was financed within the multidisciplinary programme BEAM (Baltic Eco-system Adaptive Management) at Stockholm University, headed by professor Jonas Ebbesson, and carried out by the post doc. researcher Annika K. Nilsson. This report is one of four country reports produced within this research project.

The research project

The research comprises investigation of Swedish, Danish, Estonian, and Polish law, and comparative study of approaches and regulatory means for controlling nutrient emissions – specifically from agriculture and sewerage – in order to avoid eutrophication of the Baltic Sea. In the search for effective marine ecosystem management approaches that are sensitive and adaptive to relevant ecological functions and changes, it is important to learn from the collected experiences from eutrophication control. The aim is that comparative study of differences and similarities in national legal approaches will enrich our understanding of the legal system and provide new insights and ideas of how to improve the quality of relevant regulation.

Analysing ecosystem adaptive management

The project takes its departure in ecosystem adaptive management theory. The legal order as a social structure for governance, realizing and supporting ecosystem management, should be sensitive and continuously adaptive to relevant ecological functions and change of sta-

tus. This perspective is also reflected in more recent international and regional law and policy, centrally under HELCOM and EU-law on water and marine environment. Under these legal strategies, environmental standards and levels of nutrient pollution input, and their reduction, have been or shall be formulated. The different countries implement national programmes, and specific measures to control the inputs from important sources of pollution. The management strategies and regulatory control of the actual input of nutrients vary in the different legal orders, thus taking different approaches to managing the same resources and abating a common problem. These different regulatory approaches are compared in the research project, and their ecosystem approach analysed.

The study relates to the countries' duties under international and EU law as well as the common regional strategies. The study has been limited to the regulation of water pollution, and focus on two main sources of nutrient pollution input: sewerage and agriculture.

Comparative study of national laws

Early on in the project, cooperation was initiated with Danish, Estonian and Polish researchers based at the Universities of Copenhagen, Tartu and Gdansk. In the second half of 2012, this international research cooperation conducted countrywise legal studies, which were reported in individual country studies in 2013. The resulting reports are made available digitally at **http://www.su.se/ostersjocentrum/english/beam/legal-aspects-of-the-ecosystem-approach/country-studies**, as well as on the Stockholm Centre for Environmental Law and Policy (SMC) web page to provide opportunity for further use of the data by the project group members, and other researchers.This is one of these reports.

The country studies were carried out and reported in accordance to a common template, thus ensuring comparability of the reported data. Consequently, all country base studies will show the following contents:

Chapter 1 provides an introduction to the national legal system, and the environmental problem from the national perspective. This introduction provides a context to the further study, and possibility for understanding differences and similarities.

Chapter 2 shows how, when and where central international law is implemented in the national legal order. This links national regulations to the relevant international law, and provides materials for structural comparison and assessment of the level and method of implementation. It also provides a guide for further and more functionally oriented investigations of the regulation of nutrient emissions control. The chapter covers BSAP and other HELCOM documents, the WFD, the MSD, the Nitrate Directive, and the Waste Water Directive, etc.

In Chapter 3 and 4 of the study, the regulation of the sources of nutrients pollution chosen for this study are described. Together with **Chapter 5** on river basin management, these parts are central for the study. The purpose here is both to describe the regulatory system and

to assess its potential for ecosystems approach, or lack thereof. First of all, the relevant regulatory order is to be described, including law on substantive standards and regulatory instruments for controlling compliance, and realizing the objectives and aims (which should have been mentioned above). The authors have been asked to note observations of legal and practical problems in such regulation, to not only describe "black letter law" but also "law in action".

Chapters 3–5 importantly also present reflections and some analytical observations pertaining to the presence and the realization of ecosystems approach in the relevant areas of national environmental law and management. The authors have looked for four characteristics or indicators of ecosystems approach, and have been asked to comment on a series of matters:

- **Ecological standards in regulating agriculture**. How are such standards prescribed, monitored, enforced, etc.?
- **Adaptiveness**. Is regulation adaptive to the status of the ecological systems and how?
- **Stakeholders involvement**. Are stakeholders effectively involved in the regulatory procedure, and are the effects on different kinds of stakeholders considered?
- **Legal measures in response to poor ecological status.** Is regulation flexible, so as to intervene and adjust to observed poor ecological status or changed environmental circumstances? Can stakeholders trigger such flexibility?

The reports are concluded with a closing **Chapter 6** (for the Estonian report some added information about other relevant legal measures have been presented under Chapter 6, leaving concluding remarks for Chapter 7).

Abbreviations

BAT	Best Available Technology
EC	European Community
EPA	Environmental Protection Agency
EU	European Union
EUREAU	European Union of National Association of Water Supplies
FMH	Förordningen om miljöfarlig verksamhet och hälsoskydd/Ordinance on Environmentally Hazardous Activities and Health Protection
FPL	Förvaltningsprocesslagen/Administrative Court Procedure Act
HELCOM	Convention on the Protection of the Marine Environment of the Baltic Sea Area 1992/ Helsinki Commission
HVMFS	Havs- och vattenmyndighetens författnings-samling/Regulation Series of the Swedish Ma rine and Water Management
i.e.	*id est* (that is)
KL	Kommunallagen/Local Government Act
LOM	Lagen om mark- och miljödomstolar/The Land and Environment Courts Act
MB	Miljöbalken/Environmental Code
NFS	Naturvårdsverkets författningssamling/ Regulation Series of the Swedish Environmen tal Protection Agency Series of the Environmental Protection Agency
MPF	Miljöprövningsförordningen/Ordinance on Environmental Assessment
MS	Member state
MSD	Marine Strategy Directive
MtiF	Administrative Enforcement Ordinance
N	Nitrogen

NGO	Non-governmental organisation
P	Phosphorus
PLC	Pollution Load Compiliation
Prop.	Proposition/Government Bill
PPP	Pollutor Pays Principle
RB	Rättegångsbalken/The Procedural Code
RF	Regeringsformen/Instrument of Government
SMED	Svenska MiljöEmissionsData/Swedish Environmental Emissions Data
SOU	Statens offentliga utredningar
SJVFS	Svenska Jordbruksverkets författningssamling/ Regulation Series of the Swedish Board of Agriculture
SwAM	Swedish Agency for Marine and Water Management
SWWA	Svenskt vatten/The Swedish Water & Wastewater Association
SÖ	Sveriges internationella överenskommelser/ Sweden's international agreements
VISS	Water Information System Sweden
WFD	Water Framework Directive

1 Introduction

1.1 A Study on Swedish Regulation of Nutrients Emission Control

This report presents a study on the Swedish legal system, specifically the regulatory system for controlling nutrients emissions into the Baltic Sea. The study is focused on two main water pollution sources, namely sewerage and agriculture. The report is one in a series of country studies, which serve as materials and basis for subsequent comparative legal studies. The studies are conducted within a research project aimed at investigating, in comparison, different regulatory means of such nutrients control, especially with the view of analysing the potential for an ecosystems approach in such regulation.

In the following, a general introduction will be made to the nutrients pollution from Sweden, and to the Swedish legal order. Chapter 2 provides a short guide to relevant international law, including EU-law, and implementation into Swedish law. Chapter 3–4 provides description of the regulation of nutrients pollution through sewage water and agriculture, and chapter 5 presents the regulatory basis of the water management system. In each of the chapters, analyses of potential for ecosystems approach are noted, using common characteristics or criteria for such approach. Moreover, some comments on the effectiveness and challenges of the relevant regulatory order are made. Lastly, the report is finished up with a closing part in chapter 6, summarising main points and results of the report.

1.2 Nutrient Pollution in Sweden

1.2.1 Introduction and Materials

Sweden has the largest portion of the Baltic Sea catchment area, and is also one of the main contributors of nutrient pollution to the Baltic Sea. According to HELCOM documentation Sweden stands for about

19 % of the nitrogen (N) load, and 13 % of the phosphorous (P) load.[1] The main sources are agriculture, industry and municipal wastewater treatment plants. Small-scale on-site wastewater treatment and forestry also stands for some of the nutrient loads. Sweden has a large natural background load of about half the total nutrient loads to the sea. A wide range of measures have been taken to reduce the output, and that has led to some, but far too little reduction in the anthropogenic loads.[2] The first chapter of this report will introduce the reader to the topical environmental problem in the Swedish context. In the following, some numbers on the nutrient loads (especially P and N), information on central sources of the pollution, and their respective quota will be provided. The information is based on the HELCOM Pollution Load Compilation (PLC-5),[3] based on input data from 2006[4]. Currently, Swedish authorities are preparing monitoring systems to put together the Swedish materials for PLC-6, based on figures from 2014.[5]

The Swedish Environmental Protection Agency (EPA) has commissioned SMED, which is a consortium of different expert institutions,[6] to calculate the waterborne nitrogen and phosphorus load on the coastal waters for PLC-5, and now also PLC-6. PLC-5 quantifies and describes waterborne discharges and losses of nutrients, and the loads to the Baltic Sea. It provides information for HELCOM, and for the Baltic countries, for monitoring and supporting the work of realising HELCOM and EU-law obligations and objectives regarding marine environment and good ecological status.[7] In Sweden, the compiled information provides basis for water management, for assessments of the fulfilment of environmental objectives, etc., by the Swe-

[1] HELCOM, 2011, Fifth Baltic Sea Pollution Load Compilation (PLC-5), pp. 9 and 15. See also: Extended Summary of the Main results of the Fifth Pollution Load Compilation, draft (7 May 2010), HELCOM Ministerial Declaration on the implementation of the HELCOM Baltic Sea Action Plan, 20 May 2010, Moscow, p. 2.
[2] EPA, Rapport 6500, *Steg på vägen. Fördjupad utvärdering 2012*, pp. 299 ff.
[3] HELCOM, PLC-5, Baltic Sea Environment Proceedings No. 128.
[4] The data has, however, been normalized with respect to runoff for the period 1985–2004 to account for natural climatic variability. The runoff is thus averaged over a longer period of time. See HELCOM, PLC-5 p. 10 and chapter 5. See also the report of the Swedish EPA: Rapport 5815, *Näringsbelastning på Östersjön och Västerhavet 2006* p. 15.
[5] Go to SMED web site for information on preparatory steps and improvement of the quality and relevance of the input information (http://www.smed.se/vatten).
[6] The partners of SMED are: SHI (The Swedish Meteorological and Hydrological Institute), SCB (Statistics Sweden), IVL Svenska Miljöinstitutet AB (The Swedish Environmental Research Institute) and SLU (The Swedish University of Agricultural Sciences).
[7] HELCOM, PLC-5, p. 12.

dish water authorities.[8] PLC-5 is based in official information from state authorities, and therefore practical, as well as quite sufficient as background information for this legal scientific study.

The Swedish EPA report stating reported PLC-5 information presents slightly different (lower) numbers than the final PLC-5 report. In the report the Swedish numbers is nevertheless used to show the Swedish calculation of different sources for nutrient pollution, as this presentation made specifically for Sweden, and with clearer numerical values. Moreover, 2011 SMED report on nutrient loads to water , based on monitoring information from 2009, especially to show recent developments of nutrient emissions.

1.2.2 Nutrient Loads and Sources (PLC-5)

According to the HELCOM summary of the results of the PLC-5. The Swedish total measured load of nitrogen is 121 000 tonnes/year for the year 2006. This amounted to 19 % of the total estimated waterborne 638 000 tonne input to the Baltic Sea.[9] The Swedish EPA report estimates the Swedish net load (the load to the sea, based on estimated discharges and losses, compared with calculated retention, transformation and erosion/deposition along streams and rivers) of nitrogen from rivers to the coast was estimated to 109 100 tonnes/year.

In the Swedish report the direct load of nitrogen from wastewater treatment plants and industries was estimated to 11 600 tonnes/year. The contribution from diffuse sources was estimated to 81 % of the total net load. The diffuse load varies very much between different areas of Sweden, and to different sea basins. Nutrient loads from diffuse sources are very large in the southernmost parts of Sweden, especially the loads to the Kattegatt off the west coast. This is due to high amounts of runoff and leakage from agricultural lands. About 35 % of the total diffuse net load originated from agricultural lands, but with great variations. In some areas arable lands stand for almost the entire diffuse load and a great majority of the total net load. About 50 % if the total net load of nitrogen was caused by human activities. Such human activities are in focus when it comes to regulatory control.

[8] EPA, Rapport 5815 *Näringsbelastning på Östersjön och Västerhavet 2006.* Available at http://www.naturvardsverket.se/Documents/publikationer/620-5815-9_del1.pdf, and http://www.naturvardsverket.se/Documents/publikationer/620-5815-9_del2.pdf.
[9] HELCOM, PLC-5, p. 9.

Wastewater treatment plants stand for 28 % of the total anthropogenic nitrogen load and individual sewage systems for about 2 %.

With regard to phosphorous, PLC-5 states that the Swedish total phosphorous load in 2006 was 3730 tonnes, which amounted to 13 % of the total estimated input to the Baltic Sea of 28 400 tonnes.[10] The Swedish report calculated the net load transported to the coast by rivers from inland sources to 3030 tonnes/year, and directly released phosphorous estimated to 520 tonnes/year. Diffuse sources calculated as 76 % of the total load to the sea. 37 % of the diffuse net load originated for arable lands, again with great variation between areas. 44 % of the total net load of phosphorous was caused by human activities. Wastewater treatment plants stand for 23 % of the total anthropogenic nitrogen load and individual sewage systems for about 11 %.

The table below provides numbers of Swedish estimations and calculations of gross and net loads from different kinds of sources.

Table 1
PLC-5, Swedish nutrient loads[11]

Source	Gross load Nitrogen (tonnes)	Net load Nitrogen (tonnes)	Athropogenic nitrogen gross load (tonnes)	Anthropogenic nitrogen net load (tonnes)	Gross load phosphrus (tonnes)	Net load phosphorus (tonnes)	Anthropogenic phosphorus gross load (tonnes)	Anthropogenic Phosphorus net load (tonnes)
Arable land	52 700	34 400	38 200	24 300	1590	1010	940	620
Forest land	47 800	38 700	3 300	2 600	1 260	950	20	20
Open land, mountain, mire	16 100	12 700			730	530		
Dep. on water	16 300	10 700	16 300	10 700	160	90		
Storm water drainage	1 700	1 500	600	600	190	140	100	70
Septic tanks in rural areas	1 800	1 100	1 800	1 100	240	170	240	170
Wastewater treatment plants	20 300	17 000	20 300	17 000	420	350	420	250
Industries	5 300	4 800	5 300	4 800	360	320	360	320

[10] HELCOM, PLC-5, p. 9.
[11] Source: EPA, Rapport 5815 *Näringsbelastning på Östersjön och Västerhavet 2006.*

The numbers can be compared to the PLC-5 numbers for the whole Baltic Sea region. A notable characteristic of Sweden is that the natural background loads stand for almost half of the total loads. For the whole region, natural background loads are reported to stand for about 1/5 of the total loads. Sweden also has a large %age of nutrient loads from point sources, and a comparatively low %age of diffuse sources, other than the natural background loads. The numbers support the basis for the choice of sources of nutrient pollutions to study in this project: While diffuse sources and agriculture stands for most of the total nutrient loads of the Baltic Sea region, some countries, such as Sweden, manifest a lot of pollution from point sources, mainly from sewage treatment facilities.[12] Sweden (together with Finland) uses little of its land for agriculture, compared to other countries within the Baltic Sea catchment area. 8 % of the Swedish land use is characterised as agriculture, while 64 % of Danish, and 53 % of Polish land is used for agriculture. Forestry dominates Swedish land use.[13]

Within the Swedish environmental objectives system[14] it is reported that Swedish emissions of nutrients generally shows a trend of slow/weak reduction, especially regarding air pollution and emissions of ammonia, but also for water emissions. The 2001 SMED report states an 11 % reduction of net loads of both nitrogen and phosphorous from all sources (and a 10 and 11 % reduction respectively of gross loads) between the years 1995–2009. Waterborne nutrient emissions have been reduced between 1995 and 2009. The national environmental objectives state that Swedish water board emissions of nitrogen compounds to the seas south of Ålands hav shall have been reduced by 30% from the 1995 levels by 2010. The result was a 25 % reduction. The waterborne emissions of phosphorous to lakes, streams and coastal waters shall similarly reduce by 20 % by 2010. The result was a 19 % reduction, which was considered quite successful even though the objective was not fully realised.[15] The EPA, however, observes that the collected nutrient loads from different countries to the Baltic are not showing any clear change between the years 1994–

[12] Compare the referred Swedish numbers to the figures of the HELCOM PLC-5 pp. 38–43, and the Extended Summary of the Main results of the Fifth Pollution Load Compilation, at pp. 13–14. See also: EPA, Rapport 5815 *Näringsbelastning på Östersjön och Västerhavet 2006*, for the report on the Swedish PLC-5 numbers.
[13] HELCOM, PLC-5 p. 20.
[14] Furter described in section 1.2.4.2.
[15] SMED Report No. 56, Beräkning av kväve- och fosforbelastning på vatten och hav för uppföljning av miljökvalitetsmålet ”Ingen övergödning”, 2011 (available at: http://www.smed.se/vatten/rapporter/rapportserie-smed).

2008. It is noted that fulfilment of the BSAP reduction targets – for Sweden and collectively – is far away.[16]

1.2.3 Swedish Loads Compared to Necessary Reductions

The HELCOM Baltic Sea Action Plan (BSAP) states country-wise reduction requirements of waterborne nutrient inputs (see Table 2), with the aim of reaching good ecological and environmental status of the Baltic Sea by 2021. The reductions are to be achieved by 2016. The total Swedish annual inputs of nitrogen and phosphorous must be reduced by 20 780 tonnes and 290 tonnes respectively, compared to the levels of 1997–2003. This can be compared to the above referred PLC-5 figures of total input for 2006 of 121 000 tonnes of nitrogen and 3730 tonnes of phosphorous. Such reductions seem a massive undertaking, especially considering the Swedish background loads.

Table 2
BSAP county-wise nutrient reduction requirements[17]

Country	Phosphorus (tonnes)	Nitrogen (tonnes)
Denmark	16	17,210
Estonia	220	900
Finland	150	1,200
Germany	240	5,620
Latvia	300	2,560
Lithuania	880	11,750
Poland	8,760	62,400
Russia	2,500	6,970
Sweden	290	20,780
Transboundary Common pool	1,660	3,780

The PLC-5 further describes the BSAP country-wise reduction requirements for different sub basins. According to these figures, the

[16] EPA Rapport 6500, *Steg på vägen. Fördjupad utvärdering 2012* pp. 299ff; EPA, Rapport 6433; *Miljömålen på ny grund. Naturvårdsverkets utökade årliga redovisning av miljökvalitetsmålen 2011. Reviderad version av rapport 6420*. (The reports can be downloaded at: http://www.miljomal.se/Global/24_las_mer/rapporter/malansvariga_myndigheter/2011/miljomalen-pa-ny-grund.pdf).
[17] Source: Baltic Sea Action Plan, Eutrophication Segment.

maximum allowable input of phosphorous to the Baltic Proper for Sweden is 569 tonnes. However, in 1997–2003 the Swedish average input was 860 tonnes, thus requiring a 291 tonne reduction. The maximum input of nitrogen to the Baltic Proper is 23 580 tonnes, but the average input in 1997–2003 was 31 667 tonnes, thus requiring an 8 087 tonne reduction. The maximum allowable Swedish input of nitrogen to the Danish Straits is 3 653 tonnes, but the average for 1997-2003 was 5 386 tonnes, entailing a reduction obligation of 1 733 tonnes. Most daunting of all are the figures for Kattegatt, where the maximum load is set at 24 582 tonnes. The average Swedish waterborne input in 1997–2003 was 35 710 tonnes. This means that a reduction of a massive 11 128 tonnes is required under the BSAP.[18] That amounts to about a third of the average input of nitrogen to the Kattegatt. As noted in the above, a very large part of the nutrients input in this area comes from agriculture.

1.2.4 Eutrophication on the Political Agenda

1.2.4.1 **A Comprehensive and Integrated Marine Policy; International Cooperation, Ecosystems Approach and Sustainable Development**

Marine environment enjoys priority in the political agenda of the Swedish government, especially following recent year developments within HELCOM and the EU. The threat against the marine environment – for Sweden mainly the Baltic Sea – has long been recognised as an important and acute challenge.[19] The eutrophication problem is often described as a very serious and acute threat and policy focus – sometimes as the most important one. There is little debate on the seriousness of the problem, and there is extensive understanding and acceptance for the need for strong policy and measures to abate the problem. The problem is how to control nutrients pollution causing the problem: how to regulate, and how to distribute the burdens of necessary control measures.

Based on earlier government's policy statements, and due to the development of the BSAP and the EU marine policy, the government has made a comprehensive policy review. In 2009 the government

[18] HELCOM, PLC-5, Box 3 on p. 76–77.
[19] See for example in financial government bills: Prop. 2006/07:100 and Prop. 2007/08:1.

presented[20] their new and comprehensive marine policy, stating that the marine environmental work must be intensified and the ambitions elevated further in order to safeguard a long term sustainable use of the resources of the sea and coastal areas.[21] The direction of the stated Swedish marine policy is sustainable use of the resources of the sea and coastal areas, ecosystem preservation and restoration, as well as development and growth of business related to the sea. It was emphasised that the marine policy must have a comprehensive approach, be integrated and multi-sectorial, and depart from a comprehensive view of exploitation and preservation. International cooperation and strong political leadership is also emphasised. The government argue this comprehensive and integrated approach as a new generation of marine policy.[22] The EU marine policy was also stated as a point of departure, and the important coordination between EU marine policy and HELCOM was emphasised. The implementation of the BSAP was stressed as central also within the EU marine strategy.[23] The government nevertheless emphasises the need for action on the national level, taking the necessary measures to implement the relevant international agreements.[24] The coordination of the implementation of, and management under the MSD, the BSAP and the WFD is stated as necessary for effective management. Such coordination was also much discussed in the consultation procedures of the national implementation.[25]

The government presented systems of marine planning and management to be introduced, in order to ensure information and knowledge, and to be able to handle conflicts of interests and manage the resources appropriately. They also initiated the work of establishing a new central agency for water issues, which subsequently led to the establishment of SwAM, the Agency for Marine and Water Management.[26] These measures were taken in response to poor planning and management of marine areas, causing problems for business as

[20] The policy was presented in a government bill, which was subsequently approved by the Parliament.
[21] Prop. 2008/09:170 *En sammanhållen svensk havspolitik*. See also the government paper Skr. 2009/10:213 on the continued efforts to improve, preserve and protect the marine environment, with focus on fulfilling the objectives of the BSAP.
[22] Prop. 2008/09:170 pp. 12ff; Skr. 2009/10:213 pp. 12ff., and 23ff. The integrated approach also echoes the EU strategy for the Baltic Sea Region stated in COM(2009) 248, the implementation of which was reported by the Swedish government in Skr. 2009/10:159.
[23] Prop. 2008/09:170 e.g. pp. 31. See also: Skr. 2009/10:213 pp. 15ff.
[24] Skr. 2009/10:213 pp. 14f.
[25] Skr. 2009/10:213 pp. 14ff.
[26] Prop. 2008/09:170 pp. 45ff. SwAM was established in 2011, based on a proposal in SOU 2010:8 and Prop. 2010/11:86.

well as for public interests such as the environment. The government argued an ecosystems approach to management, and the fundamental focus on care for the marine environment and the possibilities to improve it.[27] They also pushed for increased stakeholder participation on all levels of governance.[28] The government also presented a range of more concrete measures aimed at repairing and improving the marine environment, and strengthening of international cooperation, such as a system of fees for the output of nutrients to the sea, and further limitations for the spreading of fertilizers – in order to better realise the demands of BSAP and the EU Nitrates directive (91/676/EEC).[29] In its following paper on action for a living sea, the government develops on the problem on eutrophication and the measures taken and to be taken to fulfil the Swedish objectives and duties, stating the need for measures within all concerned sectors. It is held that the nutrient loads have been reduced considerably already, and that the preconditions for fulfilling the objectives and duties are well on the way. Nevertheless, further action is necessary, and the policy advertises action, for example requiring municipal waste water treatment plants to install and improve nitrogen compounds, implementing stricter regulations on agriculture, for example regarding the amounts, location and method for spreading manure, but also information and competence building, prohibition of phosphates in detergents from 2011, and information and more effective implementation and enforcement of the legal standards regarding private sewerage systems.[30]

The described marine policy was further developed in the following government paper Skr. 2009/10:213. Here, continued efforts to improve, preserve and protect the marine environment are presented. The focus of this policy paper is on fulfilment of the BSAP objectives. The government presents a strategic prognosis, distribution of burdens or shares between different sectors, in the task of achieving the Swedish BSAP objectives and reduction quotas by 2021. The bulk of the measures are held to be taken within areas of municipal wastewater treatment, agriculture, and the water management system.[31]

The marine policy bill states as points of departure and guiding principles, inter alia, sustainable development, ecosystems approach,

[27] Prop. 2008/09:170 pp. 37 ff.
[28] Prop. 2008/09:170 pp. 49ff.
[29] Prop. 2008/09:170 p. 136ff.
[30] Skr. 2009/10:213 chapter 4.
[31] Skr. 2009/10:213, chapter 4.4 and summarising table at p. 52.

the precautionary principles, and the Swedish environmental objectives.[32] The environmental objectives are an integrated part of environmental policy. They state the environmental dimension of the sustainable development policy in Sweden, and are used as guidance and follow-up tools for the implementation of such policy. The implementation, coordination and functioning of Swedish marine policy and law is very much built on the system of the national environmental quality objectives.[33] These will be described next.

1.2.4.2 The National Environmental Objectives – Zero Eutrophication

The overall goal of Swedish environmental policy is the "generational goal", which directs environmental governance through the stating of sixteen national environmental quality objectives. The environmental objectives describe the state of environmental to be achieved. The overall aim is to meet these objectives "in one generation", i.e. by 2020 (or 2050 in the case of the climate objective). One of these environmental objectives is "Zero Eutrophication". Others objectives connected to the eutrophication problem of the Baltic Sea Region are "A Balanced Marine Environment", "Flourishing Coastal Areas and Archipelagos", "Flourishing Lakes and Streams", "A rich Diversity of Plant and Animal Life", and potentially more. The objectives are further developed and specified in "milestone targets" (earlier "interim targets"), to define steps on the way to achieving the goals. The Government establishes both quality objectives and milestone targets. The Government also plans to adopt crosscutting plans for priority areas.[34]

The Swedish environmental objectives system goes beyond independent policy statements. It is a coherent system that is specified and monitored within the regulatory system, and the environmental objectives are consciously and strategically applied by environmental authorities and courts. They have grown to become a vital and active part of the regulatory order, in the discourse of regulatory procedure and stakeholder argumentation. In court practice, argumentation from the parties involved – operators, NGOs, supervisory authorities and other public and private parties – will often refer to the environmental

[32] Prop. 2008/09:170 pp. 18ff.
[33] Compare prop. 2008/09:170 pp. 12ff.
[34] Prop. 2009/10. For more information, go to the Environmental Objectives Portal at: http://www.miljomal.se/sv/Environmental-Objectives-Portal/.

objectives.[35] The courts will also refer environmental objectives in the judgments, but they generally seem quite cautious when it comes to explicit reasoning based upon such objectives.[36] In the often-called landmark case MÖD 2006:53, however, the Environmental Court explicitly applied the national environmental objective Zero Eutrophication. Through a systematic and teleological interpretation of the Environmental Code provisions in light of the fundamental sustainable development aim of the Environmental Code, as specified by the national environmental objectives, the court denied an applicant a permit to install a water closet in their house in the archipelago. The court argued that they could not decide the case relevantly in this system, by looking at the individual situation only. They must look to the consequences of making such a precedent for all similar cases. The court held that a general authorisation of such facilities that were in question in the present case would make it difficult to fulfil the said environmental objective. The application was consequently denied.

For the objective of Zero Eutrophication, there earlier used interim target stated e.g. 20 % reduction of phosphorous emissions generally, and 30 % reduction of nitrogen emissions to the sea basins south of Ålands hav (i.e. the Baltic Proper, Kattegatt and Öresund), both by 2010. These targets were not met. To date, no milestone targets have been set for this environmental objective.

The environmental objectives are followed up on a regular basis, in order to track the progress towards the generational goal. Government agencies assess progress and report to the Government annually. In depth assessment is moreover made every parliamentary term. The Environment Protection Agency coordinates the work and prepares the overall report. There is a public web portal on the environmental objectives (www.miljomal.se) on which the results of the follow up work is posted, together with a lot of further information.

The objective of "Zero Eutrophication" states the more precise objective that: "Nutrient levels in soil and water must not be such that they adversely affect human health, the conditions for biological di-

[35] See for examples: MÖD 2007:11, where active and strategic use of the objectives by local authorities is illustrated, and 2010:45, where the operator and concerned authorities argue different perspectives on the fulfilment of the relevant environmental objectives.

[36] Compare MÖD 2007:5, where the Environmental Court of Appeal formulated permit conditions controlling nitrogen oxide emissions, and noted the urgency of total reduction of such emissions. The court's reasoning argued with regard to the national environmental objectives on Clean Air, Natural Acidification Only, and Zero Eutrophication, but is rather careful in its explicit reference in its judgment.

versity or the possibility of varied use of land and water." The objective is specified in different respects. Regarding effects on marine environment it is stated that the Swedish and the total load of nitrogen and phosphorous compounds to the sea surrounding Sweden are below the maximum loads established within the scope of international agreements. Regarding marine status, it is held that the sea should have at least good environmental status regarding eutrophication according to the Marine Strategy Directive (2010:134). Moreover, as criteria for assessing the result of this environmental quality objective are stated as:

- Nutrient inputs will not have adverse effects on human health or be detrimental to biodiversity.
- Deposition of airborne nitrogen compounds will not exceed critical loads for eutrophication of soil and water anywhere in Sweden.
- Groundwater will not contribute to additional eutrophication of surface water.
- Lakes and streams will, with respect to nutrient levels, meet the requirements for good ecological status, as defined in the Water Framework Directive (Directive 2000/60/EC). For lakes in the agricultural landscape, this means that the total phosphorus concentration should not exceed 25 micrograms per litre.
- Nutrient conditions in coastal waters and seas will be essentially the same as in the 1940s, and nutrient inputs into the sea will not cause eutrophication.
- Swedish coastal waters will, with respect to nutrient levels, meet the requirements for good ecological status, as defined in the Water Framework Directive (Directive 2000/60/EC).
- The nutrient status of forest soils will be such as to promote preservation of the natural species composition.
- The nutrient status of agricultural soils will be such as to preserve the natural species composition.

In order to follow up environmental objectives, indicators are set up on national, and sometimes on regional level. For the Zero Eutrophication objective such indicators are, on the national level: ammonia

emissions, phosphorous and nitrogen levels and loads, as well as the amount of catch crop and protective zones utilised in agriculture.[37]

In order to reach the Zero Eutrophication objective, nitrogen and phosphorous loads to the sea have to decrease. As much of the emissions come from other countries, international cooperation, including international regulation, is central. The objective is explicitly connected to the implementation and realisation of the BSAP and the EU Marine Strategy Directive. The EU Common Agricultural Policy (CAP) is also seen as decisive for realising Zero Eutrophication.

According to the 2012 in depth assessment regarding the objective Zero Eutrophication, the state of the environment shows little or no improvement. Furthermore, the summarising assessment is that it is not possible to reach the objective with existing and planned measures until 2020. It is held that the eutrophication is unsatisfactory in many fresh and marine waters, and worst in the Baltic.[38]

1.3 International Law

Sweden has a dualist legal system. As a rule, parties to an administrative or judicial procedure in Sweden cannot rely directly on international agreements, but need to find Swedish legislation implementing the international agreements. International law may however carry a lot of authority in the interpretation of Swedish law, especially through EU-law. Consequently, the Helsinki Convention or the HELCOM recommendations are formally not directly applicable for Swedish administrative bodies or courts. They may nevertheless in practice become quite important in the interpretation of Swedish law. International law, including the Helsinki Convention, is also discussed in environmental process in Swedish courts, and taken into account in the courts' assessment of a case. The final judgment is, however, rarely based explicitly on international law. In the case MÖD 2007:12, for example, on dispensation from a dumping ban, the Environmental Court in Stockholm, as first court instance, argued provisions of HELCOM on led, zinc and cadmium contents, etc., in dumped materials, and compared the case at hand to Finnish regulation implementing

[37] Information about these objectives and indicators, and about the result of the monitoring, etc., can be found at the environmental objectives web portal (www.miljomal.se).

[38] *Miljömålen på ny grund* p. 294. For more information, go to: http://www.miljomal.nu/sv/Environmental-Objectives-Portal/Undre-meny/About-the-Environmental-Objectives/Achieved/.

the HELCOM provisions (but not explicitly based on HELCOM). Following this argument they denied the applicant dispensation. The Environmental Court of Appeal allowed a limited dispensation. It referred shortly to the existence of the Swedish EPA reference to the Finnish rules, and subsequently decided on limitation of the dumping of contaminated materials. Their reasoning, however, did not explicitly refer to the HELCOM provisions on the matter. HELCOM, as well as other international environmental law, is thus present in legal procedure, not as formally or directly applicable law, but indirectly through loyal interpretation, and as part of the legal argumentation.

In principle, application of EU law has the same dualist basis, but through constitutional provision and legal practice much EU law will be applied directly. In the Instrument of Government (RF) 10:6, the possibility to transfer competence to the EU is regulated, with some fundamental limits guaranteeing the protection of human rights and the constitutional foundations. This will in practice mean that primary EU law is directly applicable in Swedish courts. EU law will of course also become directly applicable through the law on direct effect and sincere cooperation.

In recent years, indirect application of international law through EU law has become topical. In 2009, the EU-court found in preliminary ruling that the Swedish rules on standing for NGOs were not in accordance with EU-law intended to implement the Aarhus Convention.[39] The Aarhus Convention has therefore become indirectly applicable through its implementation in EU-law. Its authority is reflected in recent Swedish case law reinterpreting access to justice in environmental matters.[40] However, the Convention is not applied directly and independently, but rather indirectly through Swedish law and EU-law.

1.4 The National Legal Order

1.4.1 The Court System

Sweden has a system of ordinary courts for civil and criminal cases, and a separate system of general administrative courts for the appeal

[39] Case C-263/08 *DLV v. Sweden* [2009] ECR-2009 Page I-09967.
[40] See: MÖD 2011:46, MÖD 2012:47 and MÖD 2012:48.

of administrative decisions.[41] The fundamental procedural regulation, The Procedural Code (RB), is applied in the ordinary courts, while administrative procedure is regulated in the general Administrative Court Procedure Act (FPL),[42] and more specifically in different areas of public law. Environmental cases are however often handled in special land and environment courts. The rules on administrative appeal are generally provided in sectorial legislation, especially for decisions that entail exercise of administrative authority against an individual (see: MB 16:12 and 19:1 and 20:2). The right to trial is further safeguarded through FL sections 22–22a, and section 3 para. 2, with reference to the ECHR.

The administrative appeals procedure is as a rule reformatory and one of full appeal, meaning that the administrative courts decide cases on the merits as well as legality, and that they can replace the appealed decision with a new one. The court takes on the role of the authority that made the appealed decision, and thus acts as a public authority making an administrative decision. The ultimate responsibility for the investigation of the case therefore rests with the court according to the "ex officio principle", FPL 8 §. The idea is that the original decision-making authority should ensure sufficient decision-making material, but if needed the court should take on this responsibility. They should steer the parties of the case to provide sufficient decision-making materials, according to the 8 §, and they have certain powers to bring more evidence to the case, and to order the parties to complete their application or appeal (for example FPL 5, 13, 23-24 §§).

As a general rule, access to court in appealable administrative cases is provided for the benefit of concerned parties that the decision goes against (FL section 22 of and FPL section 33). This generally means the parties to the appealed administrative case, or generally the person whose legal (or otherwise legitimate) status is directly affected and who has an interest, which is considered protected by the relevant law.[43] The concrete meaning of these factors varies in different areas

[41] For more information, also in English, go to the web site of the Swedish courts, at: http://www.domstol.se/Funktioner/English/The-Swedish-courts/.

[42] In Swedish, Förvaltningsprocesslag (1971:291), available in Swedish at: http://www.riksdagen.se/webbnav/index.aspx?nid=3911&dok_id=SFS1971:291&rm=1971&bet=1971:291, and in English at: http://www.sweden.gov.se/sb/d/3926/a/26143.

[43] Prop. 1971:30 pp. 390–399, see esp. pp. 393 and 399; SOU 2010:29 p. 645; von Essen, U., *Processramen i förvaltningsmål* pp. 212–217; Ragnemalm, H., *Förvaltningsprocessens grunder* pp. 161–172.

of public law, and is generally developed in case law and often specifically regulated in sectorial legislation.

In the appeal process, the decision-making authority, whose decision is being appealed, becomes a contradictory party in the following procedure (FPL section 7a).[44] As party in the case, they have access to further appeal if their original decision is changed by the first appeal instance. There is otherwise no general rule of procedural access for other state or municipal authorities in administrative enforcement cases. Administrative law as a rule demands a statutory basis for a state authority's right to appeal against another state or municipal authority's decision.[45] In many cases a municipal authority may have a right of appeal in cases where they are considered to have a municipal interest.[46] The scope of such cases is wide and includes all kinds of public interests protected by the municipality, for example taxation, nature conservation, and administrative decisions on social welfare, etc. Sectorial legislation may provide specific rules on participation and access to court. These may also regulate rights of appeal for administrative authorities within their area of responsibility and interest. Relevant information provided in an opinion to the court should be considered in the decision-making procedure, even when not provided by parties. This is part of the inquisitorial process. The possibilities for procedural participation are hence potentially wide.

It should also be noted that governmental decisions may be challenged by seeking judicial review in the Supreme Administrative Court pursuant to Act 2006:304. This procedure furnishes a legality control in accordance with the ECHR. The legality of some municipal decisions – typically those which cannot be appealed through an ordi-

[44] Prop. 1995/96:22; Prop. 1971:30 p. 391; SOU 2010:29 ref. 655. Applicable in environmental procedures through the Environmental Code 20:3, see: MÖD 2003:19. Notably, 20:3 regulates the court procedure. In the appeals procedure before the higher administrative authority, generally the County Board, this strictly does not apply. Instead the Administrative Procedure Code applies. Nevertheless, the Administrative Court Procedure Act, for example section 7a, may be applied by analogy. In practice, the opinion and the materials submitted by the original decision-maker is generally part of the case proceedings anyway, in view of the investigatory duties of the appeal authority, and they can also appeal the decision, supported by 16:12 and 22:1 of the Environmental Code.

[45] SOU 2010:29 pp. 654–655; Bohlin, A., and Warnling-Nerep, W., *Förvaltningsrättens grunder* p. 264; von Essen, U., *Processramen i förvaltningsmål* p. 212; Strömberg, H., *Allmän förvaltningsrätt* pp. 195–196. See, also: RÅ 1972 ref 60, and RÅ 1972 ref 63, RÅ 2003 ref 86. See, also: SOU 1966:65 p. 248.

[46] Prop. 1971:30 p. 391; SOU 2010:29 pp. 652–654; Strömberg, H., *Allmän förvaltningsrätt* pp. 194–195; Bohlin, A., and Warnling-Nerep, W., *Förvaltningsrättens grunder* p. 262. See for examples: RÅ 1962:58, RÅ 1964:23, and RÅ 1996 ref 39.

nary administrative appeal – can be challenged in administrative courts by any of the municipality's inhabitants according to the Local Government Act (KL)[47]. These procedures are cassatory, meaning that the appealed decision can, if found illegal, only be revoked and not replaced with a new decision. Notably, however, such judicial review procedure is limited to these special procedures. Normally, the administrative court procedure will be reformatory and concern trial on the merits of the case.

There is no constitutional court. Constitutional review of Swedish legislation can, and should, be made in each individual case, and by every decision-making court or administrative body (RF 11:14 and 12:10). The result of finding a legal act contrary to the constitution (or to higher level legislation) is that the law should not be applied in the individual case. However, only the legislator can revoke legislation.

1.4.2 The Administration

The Swedish administration generally consists of a central national level of sectorial agencies with principal responsibilities for the realisation of administrative tasks. There are government ministries for different sectors as well. The national agencies are separate from the state government, and not headed by the minister. In the subject areas of this report, the responsible ministries are mainly the Environmental Ministry, and the Ministry for Rural Affairs,[48] and the relevant central agencies are mainly the Environmental Protection Agency,[49] the Agency for Marine and Water Management,[50] and the Board of Agriculture.[51] Next, there are subordinate regional agencies, centrally the county administrative boards, which sort under the government and are also tied to regional governments. The local level of state government hardly exists any more. Instead municipal bodies, normally specialised municipal boards, will exercise public administrative authority. The municipal boards consist of local politicians, but they have

[47] Kommunallag (1991:900). (Accessible at: http://www.riksdagen.se/sv/Dokument-Lagar/Lagar/Svenskforfattningssamling/Kommunallag-1991900_sfs-1991-900/, and in English: http://www.sweden.gov.se/sb/d/2008/a/29535.)

[48] For more information about the Swedish government and its ministries, go to: http://www.government.se/sb/d/576.

[49] For more information, go to: http://www.swedishepa.se.

[50] For more information, go to: https://www.havochvatten.se/en/start.html.

[51] For more information, go to: http://www.jordbruksverket.se/swedishboardofagriculture.4.6621c2fb1231eb917e680002462.html.

administrative tasks that include the application of law, for example monitoring and enforcement of different areas of public law.

In the Swedish administrative tradition, independence (and corresponding responsibility) of the administrative authorities is fundamental. According to constitutional regulation, in 12:1 of the Instrument of Government (RF[52]), the administrative authorities answer to the Government.[53] However, the administrative structure is characterised by a principle of separation of the functions of political decision-making on one hand, and implementation and execution of law on the other, marking a sort of separation of powers.[54] The constitutional order is not built upon the classical idea of separation of powers, but on popular sovereignty and the division of public functions. This Swedish model is supported by a kind of vertical separation of public powers through the independent public authorities.[55]

There is an important delimitation of actions of Government in the constitutional prohibition, in RF 12:2[56] against governmental interference in an administrative authority's decision in an individual case. The rule states that no public authority can determine how an administrative authority should decide in a case regarding exercise of authority against an individual or a municipality, or regarding application of the law. In order for the Government to decide in individual cases, such competence must be stated in law, for example in Swedish planning law (see PBL chapter 13), or authorisation within the permit procedure regarding large infrastructure projects, etc. (see MB chapter 17). The other side of this administrative freedom from governmental steering is that there is no principle of ministerial responsibility. Governmental decisions are taken collectively (RF 7:3 and 1:6).[57] The minister does not take the role of director or chief of the administrative authorities, and national administrative authorities are not incorporated in the ministries. The government guides the administration through budget guidelines and general steering through general in-

[52] In Swedish: "Regeringsformen".
[53] Prop. 2009/10:80 p. 290; Prop. 1973:90 pp. 397–398. See, also: Prop. 1973:90 pp. 392–393; and Sundberg, H., *Allmän förvaltningsrätt* p. 71, on early constitutional law.
[54] Holmberg, E., et.al, *Grundalagarna* p. 477.
[55] Bull, T., *Självständighet och pluralism – om vertikal maktdelning i Sverige* p. 108.
[56] RF 11:3 for the courts.
[57] Prop. 1973:90 p. 183; Prop. 1986/87:99 pp. 14–15, and 25–26; SOU 1972:15 pp. 79–80; Bull, T., *Självständighet och pluralism – om vertikal maktdelning i Sverige* pp. 112–113; Holmberg, E., et.al, *Grundlagarna* pp. 305, and 495–500; Holmberg, E, et.al, *Vår författning* pp. 208–209; Strömberg, H., *Allmän förvaltningsrätt* pp. 72–73; Sundberg, H, *Förvaltningen och rättssäkerheten* p. 329; Wockelberg, H., *Den svenska förvaltningsmodellen* p. 12, etc.

structions, policy and legislation. The government can thus control the general structure, goals and responsibilities of the different administrative bodies, but not the implementation and enforcement of law against a person in individual cases. This is coupled with a strong and widespread culture of independence among administrative authorities. A central administrative body does not, as a rule, steer a regional or local decision-maker in the individual case. The review of administrative decisions in individual cases of exercise of public authority is generally reserved for the relevant appellate body.

1.5 Environmental Law

1.5.1 Basics of Swedish Environmental Law

The Swedish Constitution does not state any right to environment as such. The Instrument of Government (RF)[58] does prescribe that promoting sustainable development is a fundamental task and objective of the public institutions (RF 1:2). Protection of human health and the environment moreover count as such legitimate interests that may provide grounds for limits or exceptions to other rights, mainly property rights (see RF 2:15). Consequently, there are grounds for environmental regulation through permit conditions and public notices and so on, without having to compensate the operator. Furthermore, public access to the natural environment enjoys explicit constitutional protection. The constitutional provisions could be invoked directly in administrative or judicial procedure, but they will normally only serve as support for interpreting lower level legislation. Constitutional provisions on environmental interests are mainly perceived as addressed to policy makers and legislators.

The central legislation in environmental matters, including water law and marine environmental law, is the Environmental Code (MB), which entered into force in 1999.[59] The former sectorial legislation was gathered in this comprehensive code, under a chapeau of a common goal formulation, environmental objectives, and general and fundamental substantive environmental principles called “rules of consid-

[58] Regeringsform (1972:152). See: http://www.riksdagen.se/sv/Dokument-Lagar/Lagar/Svenskforfattningssamling/Kungorelse-1974152-om-beslu_sfs-1974-152/, and in English: http://www.riksdagen.se/en/Documents-and-laws/Laws/The-Constitution/.

[59] Miljöbalk (1998:808).

eration",[60] and with a more integrated procedure for environmental regulation. The intentions were to coordinate and to strengthen the environmental law regulations, including their enforcement,[61] with a unified holistic approach to environmental steering. The idea is, however, that this entails a unified regulation, which is to take a more full and holistic perspective on environmental issues. The Environmental Code is consequently applicable to all activities that have significance to the aims of the Code, even when this overlaps with other areas of legislation and regulation.[62]

It should be noted that the Environmental Code contains no chapter or specific body of rules for marine environment, or for the environment of inland and coastal waters, for that matter. The relevant rules for this investigation will instead be sought in the regulation of sewage treatment systems as so-called "environmentally hazardous activities", and some special rules based in old public health law, in chapter 9 of the Environmental Code. Provisions on environmental regulation of agriculture are generally based in a few framework rules in chapter 12 of the Code. Water management is generally based in the regulation of environmental quality standards in chapter 5. As noted earlier, the general rules of consideration in chapter 2, and the overall environmental objectives of chapter 1 and in the national quality objectives, apply in all regulation under the Code.

1.5.2 Lower Level Legislation under the Framework Law of the Environmental Code

The Environmental Code has the character of framework legislation. It lays down general rules and procedural framework, and some central substantive provisions. However, much of the regulation is delegated to the Government and, further, to public authorities. Much environmental legislation is thus found in Government Ordinances and lower level legislation. The Environmental Code states the objectives, contents and limits of such delegated regulatory competences. Important lower level legislation for the purpose of this study is found in Ordinance (2013:251) on Environmental Assessment (Miljöprövningsför-

[60] In Swedish: "hänsynsregler". With some exception, these rules of consideration are built on the fundamental rules of the Environmental Protection Act of 1969 (ML). They were earlier referred to as "rules of authorisation" ("tillåtlighetsregler").
[61] Prop. 1997/98:45 Part 1 pp. 1–3, 162–164; SOU 1996:103 Part 1 pp. 21–22, 213, 217, 237–238. See: EPA enforcement guidance in Handbok 2001:4, *Operativ tillsyn* pp. 7, and 39–40.
[62] Prop. 1997/98:90 pp. 144, and 147–152.

ordningen, MPF), with central provisions on licensing obligations for all kinds of polluting installations, and Ordinance (1998:899) on Environmentally Hazardous Activities and Public Health Protection (FMH), and some general substantive requirements on sewage facilities, and then the subsequent lower level legislation of the EPA, with general substantive demands on sewage treatment facilities, emission standards, etc. Furthermore, the Ordinance (1998:915) on Environmental Care in Agriculture, and the subsequent lower level legislation of the National Board of Agriculture, state substantive rules for storage and spreading of manure, and rules on protective zones, crop cover, etc., sometimes down to a complex level of detail. The Water Management Ordinance (SFS 2004:660), with an enormous body of lower level legislation from EPA and from each regional water authority, sets up the water management system under the Water Framework Directive (WFD), including the substantive provisions on indicators and objectives, etc. For marine environmental law, there is also the Ordinance (2010:1341) on Marine Environment, and subsequent lower level legislation of EPA and SwAM, reminiscent of the water management order. This system is very much under development.

1.5.3 General Guidance from Public Authorities

Some mentioning should also be made of General Guidance and other guidance documents from the central government agencies and expert authorities on interpretation and application of important legislation. The agencies are instructed by the government to provide such guidance, and they will this way explain their understanding of the relevant provisions and information on how they should be applied. Formally, administrative guidance are only non-binding recommendations which functions as guidance to regulators on how to understand and apply the legal provisions, as well as foreseeability for the public subject to such regulation. They will, however, also be used by the regulating authorities as authoritative statements on administrative practice and official statements on the competent authorities interpretation and application of the law. Furthermore, courts will often look to these guidance documents, and refer to them in their judgments.

1.5.4 Environmental Authorities

There are many different Swedish administrative authorities involved in the environmental law and policy area, as well as a special envi-

ronmental court system. Sometimes these competences overlap, and the same activity can be under the supervision and control of several different authorities.[63] This is a reminiscence of the patchwork environmental regulatory system described above. Apart from the Ministry of the Environment, there are national agencies, most importantly the Swedish Environmental Protection Agency (EPA[64]), with broad and comprehensive responsibilities for environmental policy and administration.[65] Since July 2011, there is also a special Swedish Agency for Marine and Water Management (SwAM).[66] With the implementation of the Water Framework Directive (WFD)[67] Swedish Water Authorities were established for 5 large water districts. The Water Authorities are responsible for water management under the directive, and they are tied to five county administrative boards.[68]

The bulk of the operative regulatory supervision and control within the environmental law system is decentralised. Important administrative authorities within the environmental law system, and significant enforcers, are county administrative boards.[69] These are regional authorities under the government, thus state authorities. Besides environmental issues, they have responsibilities within planning, health care and infrastructure, and more.[70] Administrative tasks within the executive power of the state may be given not only to state authorities, but also to municipalities (RF 1:8, 8:5, and 11:6). These tasks are normally executed by municipal boards (often called "environmental boards"). These boards consist of local politicians, assisted by a staff of civil servants. They handle supervision, enforcement and some permitting. Municipal administrative authorities answer primarily to the municipality, which is led by elected political assemblies. Munici-

[63] See for example: RÅ 2003 ref.63, where it was held that the municipal board had enforcement competence in relation to a forestry activity that entailed pollution problems, despite the overlapping competence of the Forestry Agency.
[64] In Swedish: "Naturvårdsverket".
[65] See Ordinance (SFS 2009:1476) with Instructions for the Environmental Protection Agency (Förordning med instruktion för Naturvårdsverket). The EPA has a central role in the realisation of environmental policy.
[66] Prop. 2010/11:86. See also the official web page of SwAM at: https://www.havochvatten.se/en/start.html.
[67] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.
[68] For more information, go to the official website of the Water Authorities at: http://www.vattenmyndigheterna.se/Sv/Pages/default.aspx.
[69] In Swedish: "Länsstyrelserna".
[70] See: Ordinance (SFS 2007:825) with Instructions for the County Administrative Boards (Förordning med länsstyrelseinstruktion).

pal enforcement efforts therefore involve considerable political involvement, even though the cases are to a great extent processed by the civil servants. Civil servants also handle enforcement cases in the county administrative boards.

In the Swedish system of enforcement of environmental law, permitting and enforcement are systematically and functionally separate. The supervision and enforcement in specific cases of breaches of either general rules or permitting conditions is normally the responsibility of a lower level authority, creating a much decentralised enforcement system. Criminal enforcement is in turn separated from administrative enforcement and is the exclusive competence of the public prosecutors. The administrative enforcers have access to sanctions, some of them with some repressive features. The main purpose of administrative enforcement is to direct the environmental actors and activities so as to prevent, and sometimes restore harm. Their competences and enforcement instruments are characterised by this purpose.

Since the introduction of the Environmental Code, Sweden has had a special system of environmental courts. Since May 2011, there have been reconstructed as land and environment courts, handling also cases on real property and planning law.[71] There are, according to MB 20:1, five land and environment courts, and a Land and Environment Court of Appeal.[72] These environmental courts are linked to the general court system, to five local courts and the Appellate Court in Stockholm.[73] The land and environment courts will try a range of environmental cases, including tort law cases and appeal of administrative licensing and enforcement decisions in environmental matters. They also act as licensing authorities. The permitting of larger installations under environmental law is therefore a court case, and decided through the court's judgment. Therefore, apart from lawyers, experts in environmental sciences sit as judges in the environmental courts (See: LOM chapter 2).

[71] See: The Land and Environment Courts Act (2010:921) (in Swedish: "Lagen om mark- och miljödomstolar", LOM), and further in: Prop. 2009/10:215.
[72] In Swedish: "Miljödomstolar" and "Miljööverdomstolen".
[73] In Swedish: "Tingsätter" and "Svea Hovrätt".

1.6 Concluding and Summarising Remarks

Sweden is one of the main contributors of nutrient pollution to the Baltic Sea, standing for about 19 % of the nitrogen load, and 13 % of the phosphorous load.[74] The main sources are agriculture, industry and municipal wastewater treatment plants. Small scale on site wastewater treatment and forestry also stands for some of the nutrient loads. Sweden also has a large natural background load of about half the total nutrient loads to the sea. A wide range of measures have been taken to reduce the output, which has led to some, but far too little reduction in the anthropogenic loads.[75] Eutrophication is well recognised as a crucial and acute environmental problem, and widely accepted public policy reflect ambitions aims of combatting eutrophication in the Baltic Sea. Official statements, however, reflect a negative view on the potential for reaching the national environmental objective of Zero Eutrophication, or fulfilling the reduction targets or objectives of the BSAP in time.

Sweden has a dualist legal system, where international law as a rule has to be implemented into Swedish law in order to become legally binding for all and applicable for the public authorities. However, the direct and indirect effects of international law independently, and especially through EU-law, makes international law an authoritative source of law in practice – at least when brought to the attention of the decision makers.

The main legislation of Swedish environmental law is the Environmental Code, with its massive amount of subsequent lower level legislation. Central authorities in the here studied areas of law are SwAM, EPA, the water authorities tied to the county administrative boards, and the municipalities.

[74] HELCOM, PLC-5, pp. 9 and 15. See also: Extended Summary of the Main results of the Fifth Pollution Load Compilation, draft (7 May 2010), HELCOM Ministerial Declaration on the implementation of the HELCOM Baltic Sea Action Plan, 20 May 2010, Moscow, p. 2.
[75] EPA, Rapport 6500, *Steg på vägen. Fördjupad utvärdering 2012*, June 2012, pp. 299ff.

2 International and EU Law on Control of Nutrient Emissions in Swedish Law

2.1 Introduction

The Environmental Code applies to all activities with any environmental risks relevant to the aims of the code. It states, in chapter 2, general rules of consideration, to serve as general principles of due care and precaution (including a duty to ensure sufficient knowledge, and to take appropriate precautionary measures), best location, etc. The general rules of consideration are however also operational rules, directly applicable by competent authorities in their regulation of individual cases. They thus serve not only as principles supporting interpretation and application of more specific regulation, but also as general rules that will be used when there is no specific regulation on the matter at hand, or when the individual environmental situation requires further environmental consideration than such specified in detailed rules on limit values for emissions, etc., location or time periods for certain activities, etc. The rules of consideration apply in all areas of regulation covered in this report.

2.2 HELCOM

2.2.1 1992 Helsinki Convention[76]

The 1992 Helsinki Convention is mainly implemented in the national legal order through the Environmental Code system. Centrally, the general principles of precaution, best available technology (BAT), polluter pays (PPP), prescribed in Art 3 of the Convention are paralleled in the general rules of consider. A general provision on BAT is prescribed MB 2:3 stating a due care rule, requiring necessary precautionary measures to be take, as well as BAT for business activities. More specifically, the rules concerning pollution from land-based

[76] Convention on the Protection of the Marine Environment of the Baltic Sea Area, Helsinki 1992, SÖ 1996:22.

sources (Art 6 and Annex III of the convention) are implemented in chapters 9 and 12 of the Environmental Code, and relevant subsidiary lower level legislation. Rules on environmental impact assessments (EIA), as prescribed in Art 7 of the convention, are found under chapter 6 of the code.

Chapter 9 regulates so-called environmentally hazardous activities, including sewage water treatment and polluting agricultural activities, centrally through a permit system. The permit obligation and regulation through permit conditions required in Annex III of the convention are prescribed through Ordinance (2013:251) on Environmental Assessment (Miljöprövningsförordningen, MPF). General substantive norms on extent of wastewater treatment, nutrient reduction norms, treatment of industrial wastewaters before mixing into municipal treatment facilities, etc., are implemented through EPA Regulation (SNFS 1994:7) on treatment of wastewater from agglomerations.

Best practice rules for agriculture, including rules on manure storage and spreading, on balancing nutrients in manure and the nutrients required by the crops, and on winter crops, etc. are implemented, mainly through the Environmental Code and subsidiary legislation, mainly the Ordinance (1998:915) on Environmental Care in Agriculture and the Board of Agriculture Regulation SJVFS 2004:62 on the same matter. Animal density is also regulated in this regulation. It should also be remembered that both binding and non-binding such norms are implemented through general rules of consideration, and considered within licensing and supervision by public authorities. Guidance is provided in the board's guidance on the matter, which is published together with the above stated regulation.

2.2.2 Recommendation 24/3; Measures Aimed at the Reduction of Emissions and Discharges from Agriculture[77]

There are many measures aimed at reduction of emissions and discharges from agriculture in Swedish environmental law and agricultural policy. However, the rather short and general formulations of Recommendation 24/3 are not paralleled in central legislation or policy documents, such as the Swedish Board of Agriculture action plan

[77] HELCOM Recommendation 24/3, Measures Aimed at the Reduction of Emissions and Discharges from Agriculture, Adopted 25 June 2003, having regard to article 20, paragraph 1 b) of the Helsinki Convention.

on reduced nutrient losses from agriculture.[78] The quite short and general formulations on manure handling, etc., are however well supported by the rules regarding environmental protection in agriculture, in MB chapter 12 and the subordinate Ordinance 1998:915, and further regulation (SJVFS 2004:62) of the Board of Agriculture, including general guidance, and of course by general rules of consideration in MB chapter 2. The recommendations regarding adjustment of animal diet and moisture content of manure in poultry production are not reflected, even though the Board of Agriculture action plan describes several measures do reduce ammonia volatilisation.

2.2.3 Recommendation 28E/5; Municipal Wastewater Treatment[79]

Recommendation 28E/5, is to some extent realised through the Environmental Code system, more specifically through EPA Regulation (NFS 1994:7)[80] on Treatment of Waste Water from Agglomerations, a regulation under the code and through legislation on water and sewerage services, today the Act (2006:412) on public water services.

Collection of sewage-water from both households, which is called for in section A of Recommendation 28E/5, is regulated in the Act on Public Water Services, prescribing in 6 § a duty for the municipalities to provide water services when necessary "with regard to the protection of human health or the environment". MB chapter 2 moreover prescribes general substantive requirements in the rules of consideration, and more specifically states in chapter 9 section 7 that sewage-water shall be diverted and treated in order to avoid environmental or human health nuisance.

EPA Regulation 1994:7, which is based on the wastewater directive (se further down, section 2.3.2), applies to treatment facilities over 2000 p.e. It states requirements on secondary treatment on collected waters from agglomerations according to a timetable reflecting the directive, some limit- and target values for nutrient emissions. The HELCOM Recommendation 28E/5 is nevertheless not fully implemented in this regulation. In section B of the recommendation, ambi-

[78] Jordbruksverket, Rapport 2010:10, *Minskade växtnäringsförluster och växthusgasutsläpp till 2016 – förslag till handlingsprogram för jordbruket.*
[79] HELCOM Recommendation 28E/5 (Supersedes HELCOM Recommendations 7/3, 9/2 and 16/9), Municipal Wastewater Treatment, adopted 15 November 2007, having regard to article 20, paragraph 1 b) of the Helsinki Convention.
[80] As amended through NFS 1998:7.

tious reduction quotas are to be realised according to a timetable in section B.7, and without prejudice to existing legislation applicable to EU MS. The quotas for discharges from agglomerations of more than 100 000 p.e. should have been ensured by last of December 2012, and smaller facilities are to live up similar demands for reduction of nutrients by 2015 and 2018. The currently valid recommendations require a minimum 90 % reduction of total phosphorous, or a maximum concentration in the effluent of 0.5 mg/l when discharged into marine areas. Moreover, a minimum of 70–80% reduction of nitrogen, or a maximum concentration of total nitrogen in the effluent of 10 mg/l, when discharging directly or indirectly to marine areas sensitive to nitrogen. Alternatively, the recommendations can be seen as fulfilled if reduction of the overall load in the catchment area is at least 90% for total phosphorous, and 75 % for total nitrogen. While a 70 % reduction of nitrogen is required for waster discharged to marine waters sensitive to nitrogen is required, the demand for reduction of total phosphorous is not reflected in this legislation.

Notably, however, wastewater treatment for agglomerations is generally handled within the environmental permit system, as sewage treatment plants treating sewage water collected from over 2000 persons, or a population equivalent (p.e.) of more than 2000, are subject to obligatory licensing, according to the Environmental Code and MPF, and phosphorous reduction is quite well achieved through this regulation. Numbers from the Environmental Protection Agency indicates that the chemical treatment in municipal plants removes on average over 95 % of the phosphorous input.[81]

2.2.4 Recommendation 28E/6; On-site Wastewater Treatment of Singe Family Homes, Small Businesses and Settlements Up to 300 Person Equivalents (P.E.)[82]

Recommendation 28E/6 on on-site wastewater treatment for individual wastewater treatment and small settlements is implemented through the Environmental Code, mainly chapter 2 and 9, and subsidiary legislation, mainly Ordinance (1998:899) on Environmentally Hazardous

[81] EPA, *Rening av avloppsvatten i Sverige* p. 6.
[82] HELCOM Recommendation 28E/6, On-site Wastewater Treatment of Single Familjy Homes, Small Businesses and Settlements up to 3000 Person Equivalents (P.E.), adopted 15 November 2007, having regard to article 20, paragraph 1 b) of the Helsinki Convention.

Activities and the Protection of Human Health (FMH). Implementation is supported by guidance documents.

Centrally MB 9:7 states a general demand for diversion and treatment of waste water in order to avoid detriment to human health or the environment, and that appropriate sewerage systems or alike shall be established for this purpose. FMH 12 § further states a prohibition to emit untreated wastewater from water toilets or agglomerations to water areas. Permit is required for installing an on-site toilet wastewater treatment facility or connecting a water toilet to such a facility. Other kinds of sewerage facilities require notification to the enforcement authority, providing opportunity for regulation.

While Recommendation 28E/6 provides substantive norms for maximum daily loads and treatment standards, Swedish legislation only states very general and basic treatment demands, but is silent on further standards of the treatment facilities, or detailed requirements on treatment. We need to turn to non-binding administrative guidance from the EPA on the interpretation and application of the Environmental Code's general rules of consideration, in order to find further standards. General guidance on small sewage facilities and household wastewater (NFS 2006:7) states stricter standards for areas with a higher level of protection. The basic standard – for the "normal" areas" – is that the sewage facilities must ensure at least 70 % treatment for phosphorous compounds. In the areas with higher level of protection, such as coastal areas with little retention, they must ensure at least 90 % treatment of phosphorous and 50 % of nitrogen.[83] Here we also find other recommendations on the assessment and regulation of on-site sewage water treatment, including alternative treatment options, location, etc. This is in line with Recommendation 28E/6.

2.2.5 Recommendation 18/4; Managing Wetlands and Freshwater Ecosystems for Retention of Nutrients[84]

Sweden is very rich in wetlands, and the management of these wetlands are quite well developed in law and policy. "Thriving wetlands" is set as one of the Swedish Environmental Objectives, comprising

[83] EPA (NFS 2006:7) general guidance to chapters 2 and 26 of the Environmental Code, and sections 12–14 and 19 of the Ordinance (1998:899) on environmentally hazardous activities and protection of human health] on small sewage facilities and household waste water.

[84] HELCOM Recommendation 18/4, Managing Wetlands and Freschwater Ecosystems for Retention of Nutrients, Adopted 11 March 1997, having regard to article 13, paragraph b) of the Helsinki Convention.

among other things an ambitions task of restoration and establishment of new wetlands. Financial support for restoration, creation, and management of wetlands in agricultural areas is provided under the Rural Development Programme. These policies could be seen to implement recommendation 18/4. Protection of wetlands for retention of nutrients is also indirectly achieved within the system of nature conservancy in MB chapter 7, connected to the EU Nature 2000-system, protecting many wetlands and water courses as nature reserves, etc. Moreover, draining wetlands is under general permit obligation under MB chapter 11, and in parts of the country it is completely forbidden. These rules can be said to indirectly realise said HELCOM recommendations aimed at ensuring nutrients retention.

2.2.6 Baltic Sea Action Plan (BSAP) (Eutrophication Segment)

The implementation of the BSAP has been initiated through the development by the EPA, in cooperation with the Board of Agriculture and other concerned public authorities, of a proposal for an implementation plan. The plan was published by the government on the 18 May 2010, and subsequently reported to HELCOM at the Ministerial meeting in Moscow two days later. The idea was that the proposal would consider following comments and recommendations from HELCOM and its ministerial meeting, and from the Swedish Parliament. The implementation document is to be a living document, which is regularly reviewed and updated.[85]

The implementation plan is expected to bring about very extensive reduction in nutrient pollution, at the cost of many million Euros, even though the economic benefits of the measures are also argued. For example, the nitrogen load to the Baltic Proper is expected to reduce by 7 600 tonnes, at a cost of 84 million EUR/year. These measures are mainly to be financed through existing financing channels, but the proposal holds that “new priorities” etc. of funds “may become necessary”. Without further investigation into the finances of the involved actors, this seems quite an understatement, which is also reflected in comments from the consultation round.[86]

The consultation round regarding the proposal for implementation plan resulted largely in positive and supporting comments. Many local

[85] Ministry of the Environment. Proposal for Sweden’s National Implementation Plan for the Baltic Sea Action Plan, M2010, 18 May 2010, see esp. p. 7.
[86] Ibid. p. 9.

stakeholders and organisations were interested in participating in, supporting and developing the planned measures. There were some debate on the coordination of management measures, and the balancing of different interests. Funding of the action plans was discussed, and the need for more resources for implementation was emphasised.

2.3 EU Law

2.3.1 Nitrate Directive (91/676/EEC)[87]

The Nitrate Directive contains a wide spectrum of member state obligations, e.g. designation of vulnerable areas, establishment of voluntary and compulsory norms in codes of good agricultural practices and action programmes. Moreover, the member state must monitor implementation and produce 4-yearly reports to the Commission. Swedish implementation of the good agricultural practices norms is made through an action programme for reduction of nutrient losses from agriculture. The programme is continuously reviewed with regard to new knowledge and demands. Instruments handled in the action programmes are regulation (e.g. concerning storage and spreading of manure, winter crops, etc.) under the Environmental Code and subsidiary legislation, and voluntary schemes, such as information campaigns, such as "Focus on Nutrients",[88] and different kinds of financial support schemes within the Swedish Rural Development Programme.[89] Recently the Swedish authorities have moved towards combining action programmes for the reduction of nutrient losses and of greenhouse gas emissions within the agricultural sector. The current action programme for 2011–2013 thus covers both these areas. According to the current action programme, the focus is on voluntary measures.[90] There is nevertheless extensive regulation of the matter.

[87] Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources.
[88] Focus on Nutrients ("Greppa Näringen") is a large and very popular information and education scheme offering information and individual consultation to farmers on controlling nutrient leakage, etc. For information in English, go to the webpage at: http://www.greppa.nu/omgreppa/omwebbplatsen/inenglish.4.32b12c7f12940112a7c800022239.html.
[89] The Rural Development Programme is the policy document for implementing not only Sweden's, but fundamentally the EU:s common agricultural policy, see further in 4.1.1.
[90] Jordbruksverket, Rapport 2010:10, *Minskade växtnäringsförluster och växthusgasutsläpp till 2016 – förslag till handlingsprogram för jordbruket.*

Agricultural good practice legal norms are found both in the general rules of consideration and the more specific rules on agricultural practices. Chapter 12 of the Environmental Code and the subordinate Ordinance (1998:915) on environmental care in agriculture are central legislation implementing the Nitrates Directive. Ordinance 1998:915 designates, in 5 §, large areas of the country as vulnerable zones according to the directive, and states, in 6–10 §§, requirements for storage of manure, and, in 11 §, for autumn and winter crop cover. 15 § states duties for the Board of Agriculture regarding the member state reporting duties. The Board is also given the competence to legislate subsequent and more specific rules on several aspects of these regulations. Most relevantly, regulation (SJVFS 2004:62) regulates the use of fertilizers. The general rules of consideration in MB chapter 2 supplement the described, more specific, norms for agricultural activities, and require further precaution when needed. The Board of Agriculture regulation 2004:62 provides general guidance to all the above stated norms, including the general rules of consideration.

Recent Commission reporting does not reveal problems regarding implementation and compliance in Sweden.[91] Implementation and compliance with regard to the nitrates directive has, in Swedish debate, been argued as problematic in many other countries, but generally not in Sweden. Reference is sometimes made to of the fact the live stock farming, and the use of manure fertiliser is not so intense as in many other member states.[92] NGOs have expressed criticism about low ambitions in implementation, not using the room for further environmental regulation under the directive.[93]

In 2009 the EU Commission criticised the Swedish rules on insufficient regulation of precautionary measures to regulate nitrate leakage. The rules on storage and spreading of manure where thus reviewed in order to better fulfil the nitrate directive, resulting in adjustments and clarification rather than substantial changes, for exam-

[91] Report from the Commission to the Council and the European Parliament on implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources based on Member State reports for the period 2004–2007 [SEC(2010)118 final/2].

[92] See, for example discussion within the information programme Focus on Nutrients: http://www2.jordbruksverket.se/omgreppa/omwebbplatsen/artikelarkiv/aldreartiklar/nyhetsarkiv/tidigarear/nyhetsarkivet20012005/oversynaveusnitratdirektivisverige.5.1c0ae76117773233f780004973.html.

[93] See, for example, statement of the Swedish Nature Protection Association: Svenska Naturskyddsföreningen, Remissvar angående betänkandet ”Djurhållning och miljön – hantering av risker och möjligheter med stallgödsel (SOU 2013:5).

ple clearer rules on accounting fertilizer balances, stricter rules on spreading of manure, but also new guidance to the legislation.[94] Moreover, in the recent periodical review of the vulnerable areas some adjustments were made, adding some areas but excluding others, harmonising the designation to the water management system under the WFD, and arguably resulting in designation better related to the vulnerability to nitrates pollution, and perhaps less to administrative boundaries.[95] Today, 70 % of arable lands in Sweden are designated as vulnerable according to the Nitrate Directive, and these areas are thus subject to stricter rules in the above described legislation.[96]

2.3.2 Waste Water Directive (91/271/EEC)[97]

Implementation of the EU Waste Water Directive, regulating wastewater treatment for agglomerations, is ensured through the Act (2006:412) on public water services, and the Environmental Code system, more specifically through the EPA Regulation (SNFS 1994:7)[98] on Treatment of Waste Water from Agglomerations.

Collection of sewage-water from agglomerations is regulated in the Act on Public Water Services, prescribing in 6 § a duty for the municipalities to provide water services. This duty is not, as the directive, tied to a specified size of agglomeration, or number of persons, but requiring these water services when necessary "with regard to the protection of human health or the environment". This Swedish rule is expressed in qualitative terms rather than quantitative. It must, of course, be interpreted in view of the wastewater directive requirements, and in practice there seems to be no problem with compliance.

Wastewater treatment from agglomerations of the size regulated in the directive is fundamentally handled within the environmental per-

[94] See: Board of Agriculture Regulation SJVFS 2009:82 amending Regulation SJVFS 2004:62 and the Board of Agriculture Guidance 2005:1: Föreskrifter om ändring I Statens jordbruksverks föreskrifter (SJVFS 2004:62) om miljöhänsyn I jordbruket vad avser växtnäring samt beslut om Statens jordbruksverks allmänna råd (2005:1) om lagring och spridning av gödsel m.m. See also: information from Greppa Näringen at: http://www.greppa.nu/omgreppa/omwebbplatsen/artikelarkiv/aldreartiklar/nyhetsarkiv/stallgodsel2006/reglersesoverforattklaranitratdirektivet.5.78be32b411dd24541d28000539751.html.

[95] See The Swedish Board of Agriculture report: Jordbruksverket, Rapport 2011:1, *Översyn år 2010 av känsliga områden enligt nitratdirektivet*. For further information, see: http://www.jordbruksverket.se/amnesomraden/miljoklimat/ingenovergodning/omradenkanslig aforvaxtnaringslackage.4.4b00b7db11efe58e66b8000929.html.

[96] SOU 2013:5 p. 53.

[97] Council Directive 91/271/EEC of May 1991 concerning urban waste-water treatment.

[98] As amended through NFS 1998:7.

mit system. Sewage treatment facilities are classified as "environmentally hazardous activities", MB chapter 9. As such sewage treatment plants regulated by the wastewater directive, i.e. treating sewage water collected from over 2000 persons, or a population equivalent (p.e.) of more than 2000, are subject to obligatory licensing, as prescribed in Ordinance (2013:251) on Environmental Assessment (MPF) 1:3 and 1:4 and in 28:1. These installations will always need full EIA, according to MB chapter 6 and Ordinance (1998:905) on EIA.

MB chapter 2 prescribes general substantive requirements in the rules of consideration, and more specifically states in chapter 9 section 7 that sewage water shall be diverted ad treated in order to avoid environmental or human health nuisance. The subordinate EPA Regulation 1994:7 is based on the wastewater directive, and applies to treatment facilities over 2000 p.e. It regulates collection of sewage water, the treatment installations, connection of industrial water, sludge management, self-monitoring, etc. It states requirements on secondary treatment on collected waters from agglomerations according to a timetable reflecting the directive, and some limit- and target values for nutrient emissions. The regulation also prescribes further treatment and limit values for nutrients emissions to the sea south of Ålands hav.

The Swedish municipal wastewater treatment system has a good basic structure, following large investments mainly in the 60:s and 70:s. There have nevertheless been some challenges in the continued improvement and modernisation of the plants, especially with regard to a growing call for nitrogen reduction. This has led to compliance problems. The Commission brought action towards Sweden for failure to fulfil the obligations of the Waste Water Directive, especially Art. 5 on tertiary treatment of water discharged into sensitive areas from larger treatment plants, including reduction of nitrates as well as phosphorous. The ECJ judgment discussed and applied flexibility regarding member states responsibilities for measures protecting more sensitive areas. Sweden was, however, found to have failed to fulfil the relevant obligations in 37 treatment plants.[99] The main challenge is here the extensive investments required of the municipalities.

[99] Case C-438/07 *Commission v. Sweden* [2009] ECR I-9517. See, also, the connected action against Finland: Case C-335/07 *Commission v. Finland* [2009] ECR I-0000.

2.3.3 Water Framework Directive (2000/60/EC)[100]

In Sweden, the WFD has mainly been implemented through chapter 5 of the Environmental Code, and the 2004 Water Management Ordinance.[101] This ordinance designates water districts, and handles water management authorities and their role, and the different steps and measures to be taken. Water management and other water law regulations are relevant for water management matters, and the implementation and application of the WFD.

With the implementation of the WFD, a new administrative organisation – the water authorities – was established. Sweden is divided into 5 water management districts, fundamental to the management structure and to the implementation and realisation of the water framework directive. These are established in relation to the receiving sea basins: the Gulf of Bothnia, the Bothnian Sea, the North and the South parts of the Baltic Sea respectively, and the western seas Skagerak and Kattegat.[102] The water authorities carry out the water management procedure, including regulation through water quality objectives and indicators, and establishment of management plans. Notably, however, the water authorities plan, evaluate, and coordinate the management work. They are not "operative" authorities – they do not take the concrete regulatory and other measures to realise the management plans. Such operative management measures are left to the ordinary regulatory authorities, etc.

2.3.4 Marine Strategy Directive (2008/56/EC)[103]

The Marine Strategy Directive (MSD) is currently being implemented in Swedish Law. The directive demands the establishment of a system for marine environmental management, with the overarching objective of achieving good environmental status in the regulated marine regions. The marine regions relevant for Sweden are the Baltic Sea and the North Sea, which comprises the Swedish waters in Kattegatt. The directive regulates marine waters, comprising coastal waters and the

[100] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.
[101] Förordning (2004:660) om förvaltning av kvaliteten på vattenmiljön.
[102] For more information, see the Water Authorities' official web page: http://www.vattenmyndigheterna.se/En/Pages/default.aspx.
[103] Directive 2008/56/EC of the European Parliament and of the Concil of 17 June 2008, establishing a framework for Community Action in the field of marine environmental policy (Marine Strategy Framework Directive).

sea within the exclusive economic zones of the member states. This means that the coastal waters are regulated both in the water management system of the WFD and the marine environmental management system under the MSD.

Preparatory steps required in the directive to be taken by 15 July 2012 have been carried out by Swedish authorities on schedule. These steps include an initial assessment of the environmental status and impacts of human activities, determination of good environmental status in the concerned waters (i.e. establishing what state of environment such status actually entails), and establishment of environmental targets and associated indicators. When establishing a new marine management strategy, the new central Agency for Marine and Water Management (SwAM) was also established.[104] The results of the initial assessment and determination of good environmental status were reported by SwAM in 2012,[105] stating that the current state of the regulated marine environment in many cases do not live up to the objective of good environmental status, and nutrients emissions is stated as one of the main impacts of human activities on marine environment. Among other things, reduction of eutrophication is held as necessary to reach good marine environment by 2020. Objectives and indicators for good environmental status have also been established by 2012, in specific legislation on marine management, guided by the Commission Decision on criteria and standards on good environmental status.[106]

The MSD is implemented in Swedish law through the Environmental Code, mainly chapter 5 on environmental quality norms, and the Ordinance (2010:1341) on Marine Environment, delegating further legislator powers to the Agency for Marine and Water Management. The more specific provisions on marine water management are thus found in the Regulation on Good Environmental Status and Environmental Quality Norms with Indicators for the North Sea and the Baltic Sea (HVMFS 2012:18, as amended in 2012:29). The objective, or environmental quality norm, of good environmental status for marine

[104] For more information, go to: https://www.havochvatten.se/en/start.html.
[105] SwAM, Rapport 2012:19–20, *God havsmiljö 2020, Marin Strategi för Nordsjön och Östersjön. Del 1: Inledande bedömning av miljötillstånd och socioekonomisk analys,* and *Del 2: God miljöstatus och miljökvalitetsnormer.* (The reports are both available at: https://www.havochvatten.se/miljopolitik-och-lagar/forvaltning-av-sveriges-vatten/havsmiljodirektivet/detta-ar-gjort-i-arbetet-med-havsmiljodirektivet.html.
[106] Commission Decision (2010/477/EU) of 1 September 2010 on criteria and methodological standards on good environmental status of marine waters.

environment management is prescribed in the Marine Environment Ordinance section 17. This more precise meaning of this general objective has been regulated in regulation HVMFS 2012:18, stating characteristics, or criteria, for such status in Annex 2 Part A. Regarding eutrophication, good environmental status is, in short, when concentrations of nutrients are such that there are no negative effects on biodiversity and ecosystems, and that there is no unwanted algal growth leading to worsened water quality, reduced secchi depth or indirect effects on biodiversity and ecosystems, and moreover, that there is a natural depth distribution of multiannual vegetation, and that there is no reduced concentration of oxygen following eutrophication.

In order to be able to monitor and control the general norm of good environmental status, and the subsequent criteria, indicators are moreover to be established by the member states under the MSD. SwAM has prescribed 37 such national indicators. There are currently some criteria without prescribed indicators, which can be criticised in relation to Sweden's duties under the directive. The current strategy for SwAM when setting these criteria has been to state indicators, which are today possible to monitor – under current monitoring schemes or under development.[107] The indicators therefore comprise set limits that are clear and possible to monitor within the existing system. They differ in different assessment areas (there are, for example, 18 different kinds of coastal waters which are thus handled as different assessment areas).[108]

The marine strategy also involves the setting of regular environmental quality norms, as subsequent criteria, as prescribed in Art 19 of the MSD, for example for nutrients emission, with the purpose of realising the general norm of good environmental status. The environmental quality norm regarding nutrients is states as: the concentration of nitrogen and phosphorous does not cause negative effects. The indicators for these norms have been connected to existing environmental monitoring and where there is a set limit and methods for monitoring. Regarding eutrophication such indicators refer to, e.g.: secchi depth,

[107] SwAM, Rapport 2012:19–20, *God havsmiljö 2020, Marin Strategi för Nordsjön och Östersjön. Del 2: God miljöstatus och miljökvalitetsnormer*, pp. 4 and 84, stating that the choice of indicators is much based on existing environmental monitoring systems. See also *Del 1: Inledande bedömning av miljötillstånd och socioekonomisk analys*, where indicators suggested by the Commission are investigated and discussed, noting insufficient basis for assessment where there is little information about within the current system, see e.g. pp. 159f.

[108] SwAM, Rapport 2012:20, *God havsmiljö 2020, Marin Strategi för Nordsjön och Östersjön. Del 2: God miljöstatus och miljökvalitetsnormer*, Annex 2.

concentrations of nitrogen and phosphorous (in the open sea), chlorophyll concentration (in coastal waters), oxygen balance, and propagation of macro vegetation in coastal waters. It can be noted that these descriptors are somewhat differently expressed than in the Commission decision on criteria and methodological standards on good environmental status on marine waters (2010/477/EU), probably due to the above stated departure from existing monitoring schemes.

The marine management system is under construction, and can by no means be described as complete. Monitoring programmes and action plans are under development in order to meet the timeline of the MSD. The objectives and criteria have therefore had little application in practice as of yet. By 2015 when the first action plan must be in place, we will know more about how the management objectives are to be realised, what kinds and extent of measures are to be taken, and potential challenges in this respect. No information about the kind of measures to be introduced to realise the objective of good environmental status has been found. Neither has information about stakeholder participation in the preparation of the action plan been found.

2.4 Summarising Remarks on Swedish Implementation of Rules Regulating Emissions of Nutrients

In summary, the problems of eutrophication has been a prioritised matter in national policy since, at least, the 1980s, and much regulatory and non-regulatory measures have been taken to reduce nutrient emissions and thus help abate eutrophication of the Baltic Sea. “Zero Eutrophication” is one of the 16 National Environmental Objectives set out to steer Swedish environmental policy and law. Implementation of international law of HELCOM and the EU, with relevance to regulating nutrient emissions, have been carried out in parallel to the development of Swedish regulation and policy on the matter. The ambitious EU systems for managing both marine and inland waters are to some extent still under development. However, the international law regulation nutrient emissions are generally well reflected in Swedish law. Still, however, it is held that it will be difficult, if not impossible, to reach the national objective of Zero Eutrophication, as well as the BSAP targets for Swedish nutrient emissions reduction.

3 Regulation of Sewerage

3.1 Introduction

In Sweden sewage treatment is mainly the responsibility of the municipalities. The Swedish municipal sewerage system is well developed. About 90 % of the population of about 9 million are connected municipal sewerage collection and treatment facilities. The treatment plants are generally regulated and conditioned by individual licensing. However, many sewerage facilities are still not connected to collective wastewater treatment systems. These are often private homes with on-site sewage treatment facilities.

Municipal treatment plants receive wastewater from industry, and for some plants industrial water dominates. Many larger industries, however, have their own water treatment facilities, a lot of them within the forest industry such as pulp mills. These facilities are however not in focus in this report, which focuses on domestic sewerage.[109]

Strategic policy statements and objectives on reduction of nutrient emissions in order to combat eutrophication are found in the national environmental objectives system, and in the government's strategic marine policy documents.[110] The government's marine policy states that measures have been taken in all sectors in order to reach Sweden's objectives and duties to counter marine eutrophication. This includes taking measures to realise the national BSAP implementation plan, but also further measures. The government's policy statement comprises sector-by-sector presentation of such measures, and expected shares of reductions of nutrient loads respectively. Sewerage systems are clearly noted as a main contributor, and a main sector for reduction of emissions. In the government paper on marine policy measures with focus of fulfilling BSAP objectives, municipal wastewater treatment plants are expected to reduce nitrogen emissions

[109] *Utsläpp till vatten och slamproduktion 2010*, Statistiska meddelanden, MI 22 SM 1201 (official statistics under the responsibility fo the Environmental Protection Agency, and published by the public authority Statistics Sweden), p. 7.
[110] See Prop. 2008/09:170 and Skr. 2009/10:213.

by 3000 tonnes and phosphorous emissions by 15 tonnes mainly through introduction of minimum 80 % reduction of nitrogen compounds in the largest treatment plants, and through more precipitation (adding more precipitation chemicals) in some plants.[111] The government marine policy paper also holds that existing legislation and administrative guidance on treatment standards for private sewage systems must be applied. The statement suggests that such regulation is currently insufficiently effective, and also holds that the water management action plans may provide a basis for improved regulation. Such more effective regulation is expected to reduce phosphorous loads to the sea by 33 tonnes, and nitrogen loads by 180 tonnes.[112] Ecosystems approach can be noted in that the government policy papers to some extent directs action different basins of the Baltic Sea, depending on their currently noted environmental status. Thus, treatment plants with nutrient emissions to the Baltic Proper are specifically addressed. Also, stakeholder participation is taken into the procedure, in that consultations with the industry is included in the task prescribed to the EPA to suggest means to thus improve treatment.[113]

3.2 Sewage Treatment Plants – Agglomerations

3.2.1 Introduction

Sewage treatment from agglomeration is generally carried out in municipal installations. Municipal treatment facilities have been developed since the 1940s, and today there are about 2100 municipal treatment plants. About 95 % of the connected person equivalents (p.e.) are treated in the about 470 large treatment plants (2000 p.e. and above) under obligatory permit regulation. As noted above, these treatment plants serve about 90 % of the population.[114] About 5 563

[111] Skr. 2009/19:213 pp. 36f.
[112] Ibid. pp. 46f.
[113] Ibid. p. 37.
[114] EPA, Rapport 8629, *Rening av avloppsvatten i Sverige 2010;* EPA and SWWA *Formulering av villkor och krav för utsläpp från avloppsreningsverk – vägledning*, reporting information and assessments based on official and internal statistics, environmental permits, notification and reports held by the EPA, the SwAM, Statistics Sweden, and the SWWA.

tonnes of phosphorous, 42 292 tonnes of nitrogen and 202 100 tonnes of organic material goes into the municipal plants every year.[115]

EPA information indicates that the chemical treatment in municipal plants is very effective, removing on average about 95 % of the phosphorous input. Nitrogen removal is more challenging. On average barely 60 % of the incoming nitrogen is removed, with a 70 % reduction in the largest plants (over 100 000 p.e.), but only 51 % for the medium sized (over 10 000 p.e.) and 41 % for the smaller (still over 2000 p.e.) plants under permit regulation. On average, about 95 % of biochemically oxidizable organic materials (BOD) are decomposed by bacteria in the biological treatment – except for when so much BOD is released into the water that the necessary oxygen is depleted. [116] Still, however, the licenced municipal treatment plants, in 2010, let out 267 tonnes of phosphorous, 17 419 tonnes of nitrogen, and 7 908 tonnes of BOD7. The numbers show some reductions in comparison to 2008.[117]

The smaller municipal treatment plants, for between 25–2000 p.e. are not under licensing obligation, which means that there is much less information about their effective functioning, etc. These smaller plants are calculated to stand for 5–10 % of the total volume of sewage water. They are generally assessed to be less effective than the larger plants. A survey from 1999 showed that these smaller plants stood for 6 % of the total nitrogen output and 10 % of the total phosphorous and BOD output. The general view seems to be that technological development is slower at these smaller plants, and that their proportional part of the total output may therefore today be larger.[118] In the official Swedish SMED report from 2011 on nutrient loads, it was revealed that investigations had shown that about 100 of the smaller treatment facilities had actually been connected to larger plants, some of them since before 2006. This suggests that the emissions from these plants were overestimated in the 2006 assessment, which served as basis for PLC-5.[119]According to the PLC-5, the gross nitrogen load from all the wastewater treatment plants in 2006 was estimated to 20 300 tonnes,

[115] *Utsläpp till vatten och slamproduktion 2010*, Statistiska meddelanden, MI 22 SM 1201, p. 11.
[116] EPA, Rapport 8629, *Rening av avloppsvatten i Sverige 2010*, pp. 6 and 11.
[117] *Utsläpp till vatten och slamproduktion 2010*, Statistiska meddelanden, MI 22 SM 1201, p. 11.
[118] *Utsläpp till vatten och slamproduktion 2008*, Statistiska meddelanden, MI 22 SM 1001 p. 21.
[119] SMED Rapport 56, Beräkning av kväve- och fosforbelastning på vatten och hav för uppföljning av miljökvalitetsmålet ”Ingen övergödning”, 2011, p. 17.

and the net load to 17 000 tonnes. The gross phosphorous was estimated to 420 tonnes, and the net load to 350 tonnes.

Nitrogen emissions from Swedish industry and wastewater treatment plants have been highlighted under the environmental objective system. The interim target of 30 % reduction of anthropogenic emissions to the seas south of Ålands hav by 2010 was not met, even though some reductions were made. The EU Commission infringement procedure against Sweden regarding the Waste Water Directive was noted, forecasting the need for treatment plants of several larger Swedish towns to have to improve nitrogen reduction.[120] Swedish municipal treatment plants are now working to get up to speed with the introduction of nitrogen reducing treatment steps, especially since the Commissions actions and the ECJ judgment.

3.2.2 Duties to Provide Public Water Services

According to the Act (2006:412) on Public Water Services 6 §, together with 2–3 §§, public water services, including the collection and treatment of sewage waters, shall be provided through public installations owned or controlled by the relevant municipality.[121] The duty is not tied to a specified size of agglomeration, or person equivalents. Public water services are required when necessary "with regard to the protection of human health or the environment".

The Swedish rule is thus expressed in qualitative terms rather than quantitative. Preparatory works do not specify the extent of the nuisance involved that will trigger the municipal duty, or the extent of the benefits of a public treatment facility. Nor are the views of property owners or other stakeholders directly relevant for triggering a legal duty for the municipality to install public wastewater collection and treatment facilities. The County Administrative Board may, according to the Water Services Act 51 §, order the relevant municipality to carry out their duties under the Act. In the end it will be a matter for the courts to interpret the law and decide in the individual case whether water services are necessary according to 6 § and the municipality thus obligated to provide them. For example, in a case before an ad-

[120] Case C-438/07 *Commission v. Sweden* [2009] ECR I-9517.

[121] The requirement of public ownership or control can be drawn from the definition of public water installation in 2 §, read together with 3 §, and the government bill, See prop. 2005/06:78 pp. 26ff., and p. 133. The act opens up for privately owned businesses, but keeps municipal control over such operations, in order to protect the public interests involved.

ministrative court of appeal,[122] the court reasoned, based in the investigations produced by the involved authorities, that the agglomeration in question was typically one that would need water services provided and coordinated in a larger and more comprehensive context and for the whole area. There had, moreover, been some problems with contaminated drinking water in the area. The current collective installation was deemed insufficient to solve the problems involved, and to provide sufficient protection of human health in the long run. Public water services were therefore needed, and the municipality was ordered to fulfil their duties to provide them.

Problems with provision of water services will generally be connected to more rural areas, as agglomerations of some substantial size are generally connected to the municipal sewerage system, and to municipal wastewater treatment plants. However, Sweden is a large and scarcely populated country, and there are some financial and practical challenges to providing public water services in some parts of the country where people are more spread out. Even though the municipal system for collecting sewage water is about 180 000 km long, including 100 000 km of sewage piping,[123] there are still many private and individual sewage water facilities, causing a rather large part of the nutrient emissions. About 1 million people live in areas not served by municipal sewage water collection and treatment.[124] They will be discussed further down (section 3.3).

3.2.3 Treatment Plants

3.2.3.1 **Introduction**

The Swedish municipal sewerage system is well developed, and the largest municipal treatment plants are regulated and conditioned by individual permit regulation. Aside from permit regulation, there are also notification obligations and supervision and control of compliance with general rules on treatment of sewage water by the competent administrative authorities.

There is a general rule in the Act on Public Water Services 10 § stating that public water and sewerage installations shall be provided and maintained so as to comply with such demands that can be made

[122] Svea Hovrätt, Judgment 16 March 2012, in case M 2403-11.
[123] EPA, Rapport 8629, *Rening av avloppsvatten i Sverige 2010*; EPA and SWWA, *Formulering av villkor och krav för utsläpp från avloppsreningsverk – vägledning* p. 3.
[124] EPA, Rapport 8629, *Rening av avloppsvatten i Sverige 2010*.

with regard to the protection of human health and the environment, and to the interest of proper management of natural resources. These demands are, according to the preparatory works, ensured through environmental law system. We will therefore turn to the environmental legislation to investigate further the Swedish regulation on sewage installations.

3.2.3.2 **Licensing and Notification**

Sewage treatment facilities are classified as so-called "environmentally hazardous activities" under chapter 9 of the Environmental Code.[125] The most hazardous such activities are under obligatory licensing requirements, and are thus individually regulated through the authorization and the conditions in such a permit.[126] Often, the permit obligation stems from (or is paralleled by) EU-regulation, and, sometimes, international agreements requiring such authorization.

Large sewage treatment plants, treating sewage water collected from over 2000 persons, or a population equivalent (p.e.) of more than 2000, are under licensing obligations. Such obligation echoes EU-law demands on wastewater treatment.[127] Licensing is done by regional licensing boards (connected to county administrative boards) with appeal to the land and environment courts.

Moreover, if not under this licensing obligation, notification to the administrative enforcement authority is required for treatment plants built for serving over 200 p.e.[128] This notification procedure provides opportunity for the enforcement authority to regulate through enforcement orders, or to order the operator to apply for a licence, if deemed necessary. The notification requirement is coupled with a duty to provide information on the operation, and its environmental effects, to the authority. This notification procedure thus becomes a regulatory

[125] An environmentally hazardous activity is one that is land based, that is based on a piece of real property and of some permanence, and moreover causing pollution or disturbance – or nuisance – in the surrounding environment, that is, outside the relevant piece of real property.
[126] MB 9:6 provides grounds for lower level legislation on licensing and notification before establishing, operating, emitting wastewater, etc., and for changing previously licensed installations. Such obligations are prescribed in MPF 1:3–4, and chapter 28. The competent supervision and enforcement authority may also, according to MB 9:6, order an operator to apply for a license if the activity involves considerable risks to the environmental or human health.
[127] Council Directive 91/271/EEC of 21 May 1991 concerning urban wastewater treatment, OJ L135/40, requiring collection of waste water from agglomerations of 2000 p.e., and above, and secondary treatment at least for waste water discharged into freshwater and estuaries.
[128] MB 9:6 and MPF 1:10–11 and, 28:2.

procedure in advance, comparative to a permit procedure but less formalistic and with more room for regulatory flexibility.

3.2.3.3 **Environmental Impact Assessment**

According to MB 6:1, an application for a permit under chapter 9 shall include and Environmental Impact Assessment (EIA). Also notification to the administrative enforcement authority may be required to include an EIA, if this is considered necessary (FMH section 25). In practice, the authority would order the notifier to make an EIA when they find that this is needed for appropriate procedure, and (ideally) according to the EIA-directive. It should be noted that this only applies to an application for a new or changed operation, and not for review of a permit. As the municipal wastewater treatment system is quite established already, new applications are few, and therefore, the EIA-instrument will not be triggered that often.

Before a permit application, or notification, is submitted, the operator shall consult the County Administrative Board, the administrative enforcement authority, and the individually concerned public. If the operation is anticipated to have significant environmental impacts, other stakeholders shall also be consulted, namely concerned state authorities, municipalities, and the wider scope of concerned public, as well as organisations. The consultation shall comprise the localisation, extent and nature of the operation, as well as its anticipated environmental impact (MB 6:4 para. 2). An operation with significant environmental effects requires more of the EIA. After consultations, a permit application and EIA-documentation is produced and submitted to the permit authority, who will then remit the documents to municipal environmental boards and other authorities and members of the public who have made statements during consultations. After this further consultation, the permit authority orders the application to supplement the application if necessary. Notification of the application and the EIA-document is moreover published. These are public documents, which are accessible for the public, and anyone may submit opinions to the permit authority. The permit authority must then, according to the "ex officio" principle, take into consideration any relevant information made available to them during the permit procedure.

The EIA can be appealed together with the permit decision, along the earlier stated chain of courts. A permit decision by the licensing board is appealed to a land and environment court.

3.2.3.4 **Supervision and Enforcement**

Sewerage systems and sewage treatment facilities are mainly regulated under the rules on environmentally hazardous activities and protection of human health, MB chapter 9 Supervision and enforcement of permit conditions and general rules of environmental law for sewage treatment facilities are consequently the competence of county administrative boards and the municipal environment boards.[129] The main organisational idea is that the licenced activities are supervised and enforced by county administrative boards, while the environment boards enforce the non-licenced activities. In reality, much of the enforcement of permitted activities is delegated to the environment boards.[130] The result is a decentralised system for enforcing environmental law, with the municipal environmental boards as the principal operative enforcement authority.[131] They are supported by enforcement guidance from county administrative boards and national authorities.[132]

Administrative enforcement authorities have a fundamental duty to exercise supervision and control of compliance with the Environmental Code in order to realise its aims and purposes (MB 26:1), which, according to case law and administrative praxis, entails that they are required to initiate a case in response to a relevant complaint, and finish the case with a decision. This decision, either to take enforcement action, or not to take action, can be appealed by the concerned parties.[133] This means that the concerned public can trigger an administra-

[129] The administrative enforcement authorities are prescribed in MB 26:3, and chapter 2 of the Ordinance (SFS 2011:13) on Administrative Enforcement of Environmental Law (Administrative Enforcement Ordinance).

[130] Such delegation of powers is supported by MB 6:3 Para. 4, and by the Administrative Enforcement Ordinance. The County Boards are to some extent mandated, or obligated even, to take back the enforcement competence delegated to the municipalities. In practice this would require severe maladministration, and such return of delegation of powers is extremely rare (see MB 26:4, Administrative Enforcement Ordinance 1:21–22; and Prop. 2002/03:54).

[131] Prop. 1997/98:45, Part 1 pp. 498 and pp. 573–575, and Part. 2 p. 268; SOU 1996:103 Part 1 pp. 555–556, and 562–563, and Part 2 pp. 297–298. The municipal authorities can ask for delegation of the administrative enforcement competence, and in 1988 (Prop. 1987/88:85) the municipalities were given the administrative enforcement task relating to non-permitted activities, as well as the possibility to be delegated such tasks relating also to permitted activities.

[132] Administrative Enforcement Ordinance chapter 3 section 1.

[133] MÖD 2000:43, MÖD 2000:44, drawn from case law from the Supreme Administrative Court: RÅ 1995:55 and RÅ 1996 not 190. See also praxis from the Parliamentary Ombudsman for example in: JO 2002/03 p. 357, JO 2008/09 p. 384, and Decisions on: 2 July 2003 (dnr 1017–2002), and 28 October 2003 (dnr 3450-2001). See also: Darpö, J., *JO, de närboende och miljön* pp. 72–75, and Nilsson, Annika K., *Enforcing Environmental Responsibilities* pp. 156–158.

tive procedure, and appeal decisions not to regulate, which gives them an important means of stakeholder participation.

The administrative enforcement authorities are also under duty to report suspected criminal offences, such as non-compliance with licence conditions, and to initiate permit review when appropriate. Such review is, however, very time and resource consuming, and hardly ever initiated by the administrative enforcement authorities. Criminal enforcement of non-compliance is to some degree exercised regarding municipal wastewater treatment installations. It may often be difficult to find the responsible person and to prove criminal intent or negligence. Criminal enforcement is not a main focus of public control.

The enforcement authorities are empowered to supervise the regulated installations, to gain access (MB chapter 28) for inspections, and demand information and investigation from the actor (MB 26:21–22). From licenced installations they will receive an obligatory annual report on compliance with the licence conditions, any problems occurred in this respect, and what is done to solve the problem (MB 26:20). This will often serve as basis for the authority's supervision and control. They have powers and instruments to enforce legal obligations. These include ordering the operator to take precautionary measures, or prohibiting a certain activity. However, the enforcement competence is limited by permit regulation. The authority cannot require stricter measures for such matters that are regulated in the licence, except pressing measures to avoid serious environmental damage or human health problems (MB 26:9). Their enforcement orders may be coupled with a conditional fine. The enforcement authority may also decide to take default action, at the expense of the responsible operator, should this prove necessary, or they may seek enforcement by the bailiff (MB 26:17–18). It should also be mentioned, in this context, that there are general rules on control of emissions from facilities for treatment of sewage water from agglomerations, prescribing method and periodicity, etc., for monitoring emissions. These rules are found in the EPA regulation (SNFS 1990:14) on control of emissions to water and ground recipients from facilities for treatment of sewage water from agglomerations.[134]

The Swedish system for environmental law regulation thus separates licensing and enforcement functions as means of regulating ac-

[134] Kungörelse med föreskrifter om kontroll av utsläpp till vatten- och markrecipient från anläggningar för behandling av avloppsvatten från tätbebyggelse.

tors under environmental law.[135] Enforcement instruments connected to the permit; such as revocation and review of the permit conditions, are consequently under the competence of the permitting body. The administrative enforcement authorities apply for such measures, but the permitting authorities have exclusive competence to decide whether and how such measures are to be made.[136] Therefore, the general picture is that no single enforcement body has access to the full scale of administrative enforcement instruments. Additionally, for some coercive enforcement measures the enforcers need to go through other authorities, for example the awarding of a conditional fine.[137]

An organisation that should be noted, in this context, is the Swedish Water and Waste Water Association (SWWA).[138] SWWA was set up by the municipalities in 1962 to assist on technical, economic and administrative issues and to represent the interests of the municipalities in contact with authorities and other organisations. SWWA collects and evaluates statistical data, puts together recommendations and guidelines and educate members. SWWA is a member of EUREAU, the European Union of National Association of Water Supplies.

3.2.3.5 **Substantive Standards for Sewage Treatment Plants**

Permit regulation and monitoring of treatment plants will primarily focus on emission of phosphorus, nitrogen and BOD7. Permit conditions for the largest treatment plants will generally include water emission standards formulated as target values or limit value regarding such emissions. While a limit value indicates a level that can never be exceeded, a target level is defined as a level that, when exceeded, trigger a duty to take measures. As breach of permit conditions is criminalised, this means that exceeding a limit value per se is a crimi-

[135] Prop. 1997/98:45 Part 1 p. 471.

[136] Traditionally however, the regulation of conditions for supervision and control of a permitted activity – a "control program" has been delegated to the enforcement authority. These may be argued to give the enforcers some tasks in the permit process. The matter of the normative functions of the administrative enforcers has been discussed for example in MÖD 2002:23. Notably, also the Environmental Court of Appeal has more recently reformulated their case law stating that in accordance with EU law and legal certainty, the permit conditions have to regulate also supervision and control matters, even though details of how to carry out these matters can still be left to the enforcement authority to prescribe in a control program, see MÖD 2009:2 and 2009:9.

[137] A conditional fine is a monetary fine. They are regulated in the Act (1985:206) on Conditional Fines ("Viteslagen"). An enforcement order can be coupled with such a fine as sanction for non-compliance. Competence to prescribe such sanctions is stated in MB 26:14.

[138] For more information, go to the official web page of SWWA at: http://www.svensktvatten.se/Om-Svenskt-Vatten/Om-oss/In-English/.

nal offence. For target levels, the criminalisation is instead tied to the failure to take measures in response to exceeded emission levels. Target levels have been developed in administrative practice since the early 1980's, and reinforced by the courts. They are also used in the applicable EPA regulation (1994:7). Target levels have enjoyed wide acceptance, and have been endorsed because of the flexibility they provide. This is argued to have meant that stricter emission levels can be set, than what would be considered realistic when using limit levels.[139] Since 2009, however, the Land- and Environment Court of Appeal, based on Supreme Court reasoning on clear and enforceable permit conditions,[140] does not accept target values as permit conditions.[141] It is held that such conditions do not provide the permit holder with information on how to act and when. This makes target values unenforceable and therefore unacceptable. The precedents also contain statements on the importance on specification of the control of stated limit values, for example how frequency and method of monitoring and assessment of monitoring information.

Target values are nevertheless still widely found in older permits and in EPA regulation, and there has been some uncertainties in the following case law from the land- and environment courts, stating "target-like" emission levels. In 2012, however, the Land- and Environment Court of Appeal again stated that the use of target values is not acceptable, and clarified that "target-like" levels are not acceptable either. However, the court's reasoning recognises the need, in some cases, to formulate limit values that provide room for flexibility, so that exceeding the emission limit that does not constitute a criminal offence in every instance. Such flexible conditions must nevertheless set an absolute limit. In the cases at hand, the court therefore set a limit value that will be fulfilled if 10 out of 12 monthly average values in one calendar year keep within the limit.[142]

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[139] EPA. Rapport 8629. *Rening av avloppsvatten i Sverige 2010*; EPA and SWWA, *Formulering av villkor och krav för utsläpp från avloppsreningsverk – vägledning* p. 9.
[140] NJA 2006 s. 310.
[141] MÖD 2009:2, MÖD 2009:9, MÖD 2009:49, 2011:18 and 2012:10. The precedents also contain statements on the importance on specification of the control of stated limit values, for example how frequency and method of monitoring and assessment of monitoring information. See, also: Michanek, G., and Zetterberg, C., *Den Svenska Miljörätten* pp. 258f.
[142] MÖD 2012:10 and MÖD 2012:21. The development is discussed in: EPA, Rapport 8629, *Rening av avloppsvatten i Sverige 2010*; EPA and SWWA, *Formulering av villkor och krav för utsläpp från avloppsreningsverk – vägledning.*

In summary, target levels are still very much in use in the regulation on wastewater treatment plants, despite the fact new case law on permit regulation demands clear statement of limit values, but where some room for error can be clearly stated. Until provisions on target levels are reviewed, they will probable, as a result of the described case law, be difficult to enforce. Valid law on substantive standards for nutrient emissions can therefore only be presented with some reservation regarding the authority and the enforceability of the norms.

With that reservation, it can be said that target values for phosphorous will generally be set at 0,3–0,5 mg/l. The target value for BOD7 in outgoing sewage water is generally set at 15 mg/l for BOD7, and for CODCr at 70 mg/l. For nitrogen, the plants contributing to the pollution of sea and coastal areas of the southern parts of Sweden are regulated more strictly. The permit conditions for plants of 10001–100000 p.e. are under general provision in the EPA Regulation (SNFS 1994:7) on treatment of wastewater from agglomerations, stating in section 6 a target level of 15 mg/l nitrogen in outgoing sewage water. The largest plants (>100 000 p.e.) have the target level 10 mg/l. These plants must also reach a target of 70 % reduction of nitrates.

Furthermore, it is prescribed, in sections 8–9, that the thus stricter regulated treatment plants must be constructed or altered so that representative samples can be taken, and be constructed, built, operated and maintained so that the function satisfactory in all normal local climate conditions. Interestingly, the regulation also states a sort of eco-cycle approach, prescribing in sections 11–12, that treated waste water and the sludge from the treatment procedure shall be reused when appropriate. Waste waster and sludge shall be disposed of so that to minimise environmental effects.

There is always the possibility, in the individual case, to state stricter emission levels when this is motivated by local conditions. There can often be reason for such individual regulation when it comes to eutrophication, as local problems with heavily eutrophic coastal waters or inland water are common and to some extent separate from the general regulation of marine eutrophication. Aside from the general prescription of reduction target norms with regard to nitrogen is specifically regulated for the basins of the Baltic Sea that are sensitive to such pollution, little proof can be seen of active regulation in relation to the ecological status in the relevant recipients. All documentation point to rather general norms of reduction targets as main conditions in permit regulation of treatment plants. It may well be that water quality norms and ecological status has been, and is today, con-

sidered in the regulatory procedure, but it seems such norms are not actively applied in the continued regulation and monitoring of the once permitted plants. Moreover, review of permits is a very extensive and expensive procedure, which is rarely done. This shows a rather low potential for responsiveness in the regulation of treatment plants.

3.2.3.6 **Monitoring**

Swedish environmental law requires monitoring and control, etc., over every environmental activity of environmental significance. There is a general duty of self-supervision, based in general rules of consideration in chapter 2 of the Environmental Code, but also more specifically in chapter 26 section 19. For licenced operations this self-supervision is more formalised and regulated in detail, but the duty is generally applicable. Wastewater treatment plants under the above described permit regime will also have to produce annual environmental reports with information on compliance with permit conditions. There are generally permit conditions stating a scheme for monitoring, and more detailed control programmes set up for thus permitted operations. According to earlier described recent case law, the monitoring obligations should be clearly stated in the permit conditions.

The described regulatory scope means that there is a lot of monitoring and documentation, etc., for the activities under permit regulation. Much more is therefore known about compliance and environmental effects of these larger operations. For smaller treatment plants, the administrative enforcement authority – the municipal board – may prescribe more specific monitoring and reporting duties. According to 26:19–21, they may require existing information, new investigations, setting up of control programmes, etc. Such ordered requirements may entail periodical duties, for example annual reports to the authority. Often, notification of an operation to the authority will result in a decision from the authority to order precautionary measures, including such monitoring, investigation, documentation and reporting etc. These orders, or public notices, thus become a kind of conditions for authorisation. However, the situation may vary considerable, and there is therefore no general monitoring requirement for the smaller plants.

3.2.3.7 **Compliance and Regulatory Challenges**

Monitoring regarding existing permit conditions on target levels have shown that during 2010 the average value for outgoing phosphorus

was 0,22 mg/l, which was lower than 2008. The average value of outgoing nitrogen was 14,7 mg/l, which was roughly the same as 2008.[143] There are reports stating the total result in terms of concentrations of the relevant substances on national level, and for categories of licenced treatment plants. Such reports have indicated that the average concentrations have been well under the target levels for phosphorous and BOD7. 7 of the 467 permit regulated treatment plants showed phosphorus levels in the outgoing water of over the highest target level of 0,5 mg/l. these 7 plants contributed to barely 1 % of the total phosphorus amount. Target levels for nitrogen have, however, proven more difficult to comply with. 15 out of 18 largest plants kept within the target level 15 mg/l in 2010 – one more than in 2008 For the smaller plants, to which the EPA regulation target level of 15 mg/l does not apply, the nitrogen levels are often higher.[144] It is, however, not possible to state here whether this means that they are, and in that case how many plants are, in breach of their permit conditions.

It should be noted, in context, that sewage treatment is a large part of the total Swedish anthropogenic load to the Baltic Sea – a load, which must be reduced with about 30 %. This number must be seen in the context of an estimated background load of about 50 %. Generally speaking, the 30 % cut should only be able to be made within half of the total Swedish load. The official assessment is that these quotas will realistically not be met. Moreover, the national environmental quality objectives require measures to be taken to abate eutrophication within one generation. The official assessment states that this objective will not be fulfilled with current measures.[145]

Swedish treatment plants have also experienced compliance problems in relation to EU law. Protection of the Baltic Sea from eutrophication was topical in a 2009 judgment of the ECJ,[146] which discussed the flexibility of the member states responsibilities for the more stringent measures for protecting more sensitive areas. The Commission had brought court action towards Sweden for failure to fulfil the obligations of the Waste Water Directive, especially Art. 5 on tertiary

[143] *Utsläpp till vatten och slamproduktion 2010*, Statistiska meddelanden, MI 22 SM 1201 p. 6 and 12. The average value of outgoing nitrogen was 14,6 mg/l, and somewhat lower than 2006. The average value for outgoing phosphorous during 2008 was 0,25 mg/l, which was lower than 2006. Compare: *Utsläpp till vatten och slamproduktion 2008*, Statistiska meddelanden, MI 22 SM 1001 p. 8.
[144] *Utsläpp till vatten och slamproduktion 2010* pp. 6 and 12.
[145] *Miljömålen på ny grund* p. 294.
[146] Case C-438/07 *Commission v. Sweden* [2009] ECR I-9517. See, also, the connected action against Finland: Case C-335/07 *Commission v. Finland* [2009] ECR I-0000.

treatment of water discharged into sensitive areas from larger treatment plants. Essentially, the Commission demanded reduction of nitrates as well as phosphorous, at 141 treatment plants, in order to protect areas sensitive to eutrophication.

Sweden admitted failure to fulfil the relevant obligations in 37 of the 141 treatment plants. In its defence, Sweden distinguished and listed 5 different categories of treatment plants; some of them would according to the Directive need nitrate reduction, but these requirements were not relevant for other plants, centrally those discharging water into the northernmost parts of the Baltic (the Bothnian Sea, and the Gulf of Bothnia) as the eutrophication processes of these waters are governed by phosphorous rather than nitrates.

The court's judgment established that the requirements of Art. 5 (specified in Annex II) on discharges to such sensitive areas were applicable to the relevant treatment plants only to the extent that discharges from the individual plant contribute to the pollution of that area. A causal link between the discharges and the pollution of the sensitive areas was demanded. Sweden had thus failed to fulfil its obligations under the Waste Water Directive to reduce nitrates only regarding the treatment plants the discharges of which affected waters sensitive to nitrates, and to the extent of the total effects to these waters. If the nitrates discharges to such sensitive areas were through natural denitrification, sedimentation, or secondary treatment, diminished to levels acceptable under the Directive, the demands for specific nitrates reduction treatment was deemed not applicable. This meant that the ECJ accepted the Swedish defence that the northernmost treatment plants, and some inland plants would not need such measures, as the nitrate loads were reduced through natural processes before reaching areas where the nitrates would cause eutrophication.

In summary, the main compliance problems for Swedish wastewater treatment from agglomerations pertain to nitrates reduction. Modernisation and development of the plants has struggled to keep up with the growing need for nitrogen reduction. The government's reasoning in the ECJ-case can be seen to illustrate the scope of the regulatory challenge this entails. However, that will require extensive investments by municipalities.

There are some regulatory challenges, even though plants are generally seen as "easier" to regulate, as they are large point sources continuously monitored and regulated through permit regulations. Regulating further reduction of nutrient emissions should therefore be possible. Nevertheless, current regulatory and administrative means for

achieving necessary reductions is commonly held as insufficient. A recent report suggests a trading system for emission certificates. It shows investigation of current means and argues that making the necessarily large cuts in emission standards through general provisions, or through individual regulation through permit reviews, etc., is not realistically plausible today. There is, first of all, no financial possibility for the competent authorities to initiate necessary permit reviews. Secondly, such large reductions will not be considered reasonable in the regulatory procedures of the courts and administrative authorities, or in legislatory process. In short – no regulator will go as far as is in fact necessary to meet the reduction duties under international law. The report therefore points to the alternative of using economic incentives and burden sharing in a sort of cap-and-trade-system.[147] This alternative is, however, only at a very preliminary and theoretical stage.

3.3 Individual Sewerage Facilities

3.3.1 Introduction

As noted earlier, about 90 % of the Swedish population is served by municipal water services, including collection and treatment of sewerage. This leaves over 900 000 sewerages outside the public services, about half representing permanent residential homes. About 660 000 are connected to water toilets, and over 470 000 of these are residential homes (which can be expected to entail higher nutrient loads, and necessity for effective treatment facilities).[148]

PLC-5 calculations relevant for assessing total emissions from individual sewerage systems estimate the gross nitrogen load in 2006 from "septic tanks in rural areas" to 1800 tonnes/year, and the net load to 1 100 tonnes. The gross phosphorous load the same year was estimated at 240 tonnes, and the net load at 170 tones/year. The calculations were based on a survey with municipal authorities in 2006, and on registers on real property taxation, demographics, statistics, etc.[149]

Private sewerages and individual on-site sewage treatment facilities have long been considered a challenging policy area, and difficult to

[147] EPA, Rapport 6521, *Styrmedel för ökad rening vid kommunala reningsverk.*
[148] SwAM, Report 2012:11, *Små avlopp ingen skitsak. Uppföljning av Naturvårdsverkets tillsynskampanj för små avlopp* p. 3.
[149] EPA, Rapport 5816, *Näringsbelastning på Östersjön och Västerhavet 2006* p. 23.

regulate. At the same time, they have been calculated to stand for unacceptably high proportions of nutrient emissions, as well as health risks with sewage water leaking into private wells, etc. There have traditionally been a lot of uncertainties about the extent and the functioning of private sewerage and on-site sewage treatment facilities, as there is no general reporting duties or other complete control systems. However, in recent years the environmental authorities have coordinated efforts in order to reduce nutrient emissions from private sewerages. Recognising the regulatory challenges, inventories of private sewerages have been made in many municipalities, and also in a nationwide survey.[150] During 2006–2008, the EPA issued new general guidance documents on small sewerage facilities, and a number of research and development projects were carried out in order to improve knowledge on small sewerage facilities and their regulation. A campaign was also carried out in municipal enforcement authorities. The campaign focused on information and knowledge, for example on spreading information through guidance materials and meetings, to the municipal regulators, and further to the homeowners with private sewerage. Information on the municipalities' efforts and experiences was also gained, thus providing a better view about the situation today.[151]

Official calculations from 2004, based on information gathered from the municipalities, state that about 40 % of the private sewerage systems do not have approved (legal) standard.[152] The treatment technique required is in principal decided in the individual case, based on the health and environmental risks involved, and the factual circumstances such as soil type, location of groundwater, eutrophication problems in nearby waters, etc. Common treatment techniques are infiltration or drain fields. Fundamentally, if a water toilet is connected to the on site sewerage, it is not enough to have only sludge removal. Nevertheless, the statistics show that such facilities are still quite common. In some areas, with higher risks, etc., a dry composting toilet or closed cistern is required, in regulation by local environmental authorities, or in planning and building regulation, as no sewage water output at all can be allowed. There are even some few local initiatives to include private sewage in ecosystem-oriented projects, where sew-

[150] See: EPA, Rapport 5415 *Kunskapsläget om enskilda avlopp i Sveriges kommuner*.
[151] *Små avlopp ingen skitsak. Uppföljning av Naturvårdsverkets tillsynskampanj för små avlopp.* SwAM Report 2012:11, pp. 3ff. Compare to earlier EPA report: Rapport 5415, *Kunskapsläget om enskilda avlopp i Sveriges kommuner*.
[152] *EPA, Rapport* 5415.

age waste from individual sewerage facilities is processed in order to provide fertilisers for local agriculture, including food production.[153] In Södertälje, where about half of the 6000 private sewerage facilities are believed to be in substandard condition, there is an eco-cycle facility that serves residents of Hölö, and collects and treats about 1500 cubic metres of sewerage from water toilets and turns it into fertilisers.[154] The potential of such solutions will, however, often rely on the possibilities to ensure a product that is not too polluted by chemicals, etc.

3.3.2 Connecting Individual Sewerages to Municipal Collection System and Treatment Plants

Where the protection of human health and environment necessitates water services in a larger context, the municipality must, according to the Water Services Act (2006:412) 6 §, provide public water services, including prescribing the operating area of these services and stating the real properties included in the area. The owners of the included real properties are entitled to use the public water services, according to 16 § of the Water Services Code, to including connecting their sewage facilities to the system for collection and treatment of sewage water. They cannot be forced to connect to the public water services. They must, however, according to 24–28 §§ of the same code, pay water services fees, regardless of being connected or not, if the property is considered to need water services. Such need is generally evident for houses with any kind of sewerage, but empty properties, or properties with only a parking lot, etc., may be excluded. This, of course, provides incentive for connecting to the public system, and having sewage water collected for treatment on the municipal wastewater treatment plant.

The water services fees, a facility fee and use fee, are administered by the municipality, or by the operator after delegation, and based on a water services rate decided by the respective municipalities (Water Services Act 34–35 §§). The fees vary from municipality to municipality. They must however not exceed the costs for operation of the public water services, including the putting aside of funds for some planned future investments and developments. This means that the water services provider must not profit on the services. The Water

[153] See: EPA Rapport 5415, referring and comparing different surveys, registers and inventories with information on the use of different technological solutions.
[154] See: http://www.telge.se/Vatten--avlopp/Avlopp/kretsloppanlaggning/.

Services Act also provides guidance on the rate for the fees, in 31–33 §§, basically prescribing that the fees should be fair and reasonable. According to SWWA, the typical residential house pays water services fees of between 247–889 SEK a month, or 0,02–0,07 SEK/liter, while an apartment household pays between 124–697 SEK/month or 0,01–0,055 SEK/liter. Recently a trend of raised rates has been noted. The SWWA notes a 4,3 % mean raise of the fees for the standard residential house, but at the same time notes that there is a great variation around the country. Generally, however, it is argued that the water services business is beginning a period of great investment needs, checking and renewing piping, and taking measures to live up to stricter safety and environment requirements, as well as adapting to the risks and effects connected to climate change.[155]

3.3.3 Regulation of Private Sewage Treatment Facilities

3.3.3.1 **Introduction to Requirements on Private Sewage Treatment**

Since early days, Swedish health law has prescribed a general demand for diversion and treatment of sewage water. Today, such rules are incorporated in the Environmental Code system, prescribing in MB 9:7 a general requirement of diversion and treatment of waste water in order to avoid detriment to human health or the environment, and also that appropriate sewerage systems or alike shall be established for this purpose. The subordinate government ordinance, FMH 12 §, further states a prohibition to emit untreated wastewater from water toilets or agglomerations to water areas. A permit is, according to FMH 13 §, required before installing an on-site toilet wastewater treatment facility or connecting a water toilet to such a facility. The municipal board generally acts as both permit authority and supervisory and administrative enforcement authority. Alternative kinds of sewerage facilities require notification to the enforcement authority – the municipal board – thus providing opportunity for regulation through administrative orders stating precautionary measures, etc. The decisions are appealable to the county administrative board and further to the land and environmental courts. If necessary to protect human health or the envi-

[155] The information is published on the SWWA web page: http://www.svensktvatten.se/Aktuellt/Nyheter/Svenskt-Vatten-nyhetslista/Pmed-taxor-2013/. For more information, see: *Fakta om vatten och avlopp*, Stockholm September 2005 p. 8, http://www.svensktvatten.se/Documents/Kategorier/Utbildning%20och%20Rekrytering/Fakta%20om%20Vatten%20och%20Avlopp%20i%20Sverige%20(svenska).pdf.

ronment, the municipality may regulate for further permit obligation in parts of its territory. The general guidance on small sewage facilities and household wastewater (NFS 2006:7), describes the materials that should be attached to a permit application or notification. [156]

As noted above, the municipal boards act as supervisory and administrative enforcement authorities. As such they have access to enforcement instruments, mainly administrative orders making proportionate requirements for example precautionary measures, pertaining to investigation and monitoring as well as assuring certain levels of treatment, etc. They may also prohibit the emission of waste water altogether, if this is motivated by the human health and/or environmental risks involved. Such prohibitions have quite often been used to regulate poor on-site wastewater treatment situations.[157] The ordering of prohibitions, rather than ordering suitable precautionary measures, must be seen in context of case law and administrative praxis, in which we have seen many cases of overturned orders to install a certain treatment technique or orders requiring the addressee to produce investigation and suggestion on a suitable treatment solution. The enforcers cannot decide specifically on what treatment should be installed if there is any indication that other solutions could work as well. At the same time they cannot shift the initiative to the addressee, but must make clear and precise statements of the duties of the addressee.[158] Therefore, they will instead – clearly and precisely – prohibit the sewage water emissions, and thus, in practice, shift the initiative to the addressee if they want to be keep using their sewerage.

3.3.3.2 **Substantive Standards for Private Sewerage**

Swedish environmental legislation only states very general and basic substantive demands on sewage water treatment, holding that all private sewerages must have further treatment facilities than sludge removal. The relevant legislation is silent on further standards of the

[156] EPA (NFS 2006:7) general guidance to chapters 2 and 26 of the Environmental Code, and sections 12–14 and 19 of Ordinance (1998:899) on Environmentally Hazardous Activities and Protection of Human Health, on small sewage facilities and household waste water.

[157] See for example in cases: MÖD 2001:34, MÖD 2004:58, and the Judgment of 29 December 2006, in case M 169-06. Note also examples of earlier praxis of the National Licensing Board, in decisions of 1 November 1995 in Decision B 202/95, and of 3 November 1995 in Decisions B 211–214/95. The National Licensing Board was and administrative authority with licensing tasks as well as handling appeal of administrative decision. In 2000 its functions was taken over by the environmental courts.

[158] See: MÖD 2004:23, and MÖD 2004:67, and earlier praxis of the National Licensing Board: 20 April 1993 in Decision B 50/93, and of 27 October in Decision B 165/93.

treatment facilities, or detailed requirements on treatment. We need to turn to non-binding administrative guidance from the EPA in order to find further standards.[159] The general guidance on small sewage facilities and household wastewater (NFS 2006:7)[160] prescribes differentiated regulation related to the environmental circumstances, and the level of protection needed. This guidance mainly states how the general rules of consideration should be interpreted and applied in the context of regulation of individual sewage treatment facilities.

Guidance 2006:7 recommends that the municipal authority, in every individual case and for every individual sewerage facility, relates regulation of precautionary measures concerning health and environment protection to "normal" or "high" level of protection. The guidance document states criteria for demanding high level of protection, all pertaining to the recipient or surroundings being sensitive to pollution through sewerage, for example: that the emissions from the topical kind of facility can be suspected to have negative impact on the protected interest in area listed as a protected area according to the Ordinance (2004:660) on management of water quality 3:2, or that the sewage water is emitted straight to a sensitive water body, or that there is a risk of the collected load in the area becoming high due to the high number of emission sources (for example in areas of predominantly leisure houses, which have over time been converted to permanent homes, thus causing successively higher pollution loads and deteriorating water quality or quantity). The area is to be regarded as sensitive when one or more of the criteria are fulfilled, and in that case, stricter standards are recommended for precautionary measures regarding wastewater treatment.

The general guidance document recommends protective and precautionary measures and limitations for both health protection and environmental protection. This presentation will focus on the latter interest. The guidance standards are not be read the same way as permit conditions, but rather as stating what results should be achieved through demands on the design of the facility combined with precau-

[159] Formally, administrative guidance are non-binding recommendations, functioning as guidance on interpretation and application of the legal provisions. They will, however, be used by regulating authorities as authoritative statements on administrative practice and official statements on the competent authorities interpretation and application of the law. Furthermore, courts will often look to these guidance documents, and refer to them in their judgments.

[160] EPA (NFS 2006:7) general guidance to chapters 2 and 26 of the Environmental Code, and sections 12–14 and 19 of the Ordinance (1998:899) on environmentally hazardous activities and protection of human health, on small sewage facilities and household waste water.

tionary measures to be taken. Furthermore, due consideration of the reasonableness of the regulation of the facilities should, according to MB 2:7; always be made. It is for example recommended that the amount and contents of the relevant emissions are considered in relation to the sensitivity of the surroundings, and whether the facilities is located in a very scarcely populated area, and if the technical measures involved are demanding for the individual. It is, however, also noted that stricter measures or reduction requirements than the guidance prescribed may be motivated in the individual case. Such requirements can, for example, be based on action programmes and measures established under the water management system.

Basic requirements for individual sewage treatment state, in the guidance document, for example that the facility should be sealed, so as to prevent leakage into, or out of, the facility. Its functioning should also be easy to control, and to maintain and service. There should be maintenance and service instructions from the supplier of the facility, and the facility should have an alarm in place, alerting malfunctioning, etc. Further requirements for environmental protection in areas of normal level of protection, are, for example the facility should be expected to achieve at least 90 % reduction of BOD7 and 70 % phosphorus, and it should make eco-cycling of nutrients possible. (The guidance also recommends that the municipality should create opportunities for such eco-cycling initiatives.) For areas of high level of protection, the same standards are required, but the reduction of phosphorus should be at least 90 %, and there should be a minimum 50 % reduction of nitrogen as well. Facilities separating urine and faeces are, however, held to motivate less strict reduction requirements. The guidance document further recommends specific function tests to assess reductions, but also states that other appropriate assessment methods carried out by an expert can also be used. Furthermore, infiltration facilities according to good practice documentation are also specified, stating that such facilities should generally be considered to ensure necessary reductions.

Guidance 2006:7 provides rather specific recommendations on location of a sewerage treatment facility, especially prescribing minimum distances and altitude differences in relation to ground and surface water. For example, a recommended distance of the outer edges of a facility to surface water or ditches of minimum 10 metres, and preferably more than 30 metres. Furthermore, the septic tank for sludge removal should be placed above ground water level. CE-marked septic tanks and piping is also recommended.

The guidance document also states requirements on the property owners self-supervision and control, according to MB 26:19, which is described in section 3.2.3.4. The facility should be used and maintained in accordance with any instructions, and a journal should be drawn up by the supplier of the facility, and kept updated by the property owner, making notes of refill of chemicals, sampling, substantial measures, change of materials, or other measures of significance to the functioning of the facilities. Operating and maintenance instructions, journal, and blueprints should be kept on the property and be produced on the request of the regulatory authority. It is also clarified that the regulatory authority can order the responsible operator of the facility (the property owner, resident, etc.) to make investigations when there is suspicion of poor functioning or operating problems that could mean that the facility is not up to standard. Such investigations may entail sampling of outgoing wastewater.

3.3.3.3 **Regulatory Problems and Compliance**

As noted above, private on-site sewage water treatment installations are rather common in the comparatively vast and scarcely populated country that Sweden is, leaving about 10% of the population without municipal sewage water collection and treatment services. In some rural areas of the country, public collection and treatment of sewage water is massive undertaking, and generally not economically justifiable. This means that effective regulation of private sewerage and on-site treatment facilities is important. Furthermore, many on-site sewerage systems and treatment installations are old, and generally suspected to function poorly. It is assessed that about 40 % of the individual sewerage systems are not up to standard, according to the environmental legislation. The sewerage facilities are, however, often buried under ground and their viability and effective functioning is therefore difficult to control. These facilities are furthermore not subject to any general periodical reporting duties, even though the general duty for the actor to ensure sufficient knowledge and to monitor and control his how facility. This means that the regulatory authorities have to search for information about each individual sewerage facility and on their own initiative. The individual sewerage solutions thus add up to a rather complex mass of facilities and operators, many of them probably not functioning well, but with little information to start out from.

Furthermore, most operators of these facilities are private homeowners who generally have more limited resources for monitoring and

modernising their sewerage treatment facility. Regulation by the municipal authority can entail enormous strain on their private economy. Regulation is therefore sensitive, and may sometimes also be challenged with arguments of reasonableness and proportionality. Expressions of such challenges have long been seen in case law.

A main legal challenge for regulators has, nevertheless, not been connected to the reasonableness of the duties to install or update an on-site wastewater treatment facility, or the reasonableness of orders prohibiting any use at all of the substandard sewerage for waste water from water toilets. Such consideration could perhaps be a difficult matter of policy, or simply personal character, for the local regulator when they decide on regulatory measures towards private persons. In case law, the main legal issue is whether the regulators manage to clearly and precisely state the duties of the property owner, so that they know what they should do to act in accordance with the administrative order, and with environmental law. Parallel to this basic protection of individual legal certainty, environmental law demands both adaptiveness to environmental circumstances, and flexibility in regulation, so that the regulators cannot decide generally and unilaterally what technical solution, etc., the facility should contain. They may only prescribe duties related to the actual results of the sewerage treatment – reduction of emissions, etc. – and these duties may vary in different locations and situations. The requirements must, however, also be clear and possible to monitor, etc., so that the regulator can follow up and enforce non-compliance.

It can be noted that the latest general guidance from EPA (2006:7) makes use of "type approvals" of sewage treatment facilities, and CE-marked piping, etc., to provide simple and clear direction of rather "safe bets" in choosing a treatment facility that will be safe from further regulation. The guidance still leaves room for flexibility and adaptiveness in stating that other technical solutions can also be used, if their functioning otherwise ensures the stated substantive standards, such as minimum reduction levels, and possibility for maintenance, monitoring and warning of malfunction, etc. The guidance also provides absolute and "preferred" minimum distances to ditches or surface waters, so as to clearly communicate to the property owner what room they have for manoeuvring in their choices. At the same time, it is stated that the sensitivity of the surroundings may motivate stricter substantive regulation of the facilities, in order to ensure necessary protection of human health and environment.

In summary, regulation of private sewage systems represents a large share of the administrative enforcement cases, and to some extent, regulation of these activities has proved challenging. As noted in introduction (3.3.1), the challenges have recent years been met with information campaigns, research and development projects, inventories, development of new guidance, etc. In the follow-up report of the EPA information campaign, it was clearly stated by local regulators that they found the campaign of limited use for their work, because of its focus on knowledge and information sharing alone. The regulators argued a need for support in their authoritative regulation of individual sewerage system operators. It was held that the information alone very seldom serves as sufficient incentive for improving wastewater treatment in private sewerage facilities. The regulators expressed a great need for guidance regarding these regulatory tasks.[161] Some of these regulatory challenges have been described above.

3.4 Ecosystem Approach and Regulation of Sewerage?

3.4.1 Introduction

In the following, some reflection will be made on whether regulation of sewerage reflects ecosystem approach, and in that case how. It should be noted that these analytical reflections are preliminary and rest mainly on expressed use of ecosystem management tools and approaches, and the clear linking of regulation to ecosystem management. The characteristics that will be analysed are the use of ecological standards, adaptiveness, responsiveness, and stakeholder participation in regulation of sewerages. These factors will be revisited in the analysis in the following chapters

3.4.2 Ecological Standards in Regulation of Sewerage

The investigation has not shown any signs of ecological standards expressly used in regulation of sewage treatment facilities. Such regulation mainly focuses on reduction target and limit values, the technical solutions and possibility for maintenance and monitoring. Ecological standards such as water quality norms can and should be con-

[161] SwAM Rapport 2012:11, *Små avlopp ingen skitsak. Uppföljning av Naturvårdsverkets tillsynskampanj för små avlopp* p. 16.

sidered when setting reduction standards, but there is little evidence of such norms being directly stated in the permit regulation of the facilities, or in the supervision and administrative control of the authorities.

Implementation and enforcement of ecological standards is mainly made at another level of regulation, entailing adaptiveness to environmental status and other circumstances. Topical ecological standards can be found in the water management system, and in the future perhaps also in the marine environment management system, stating water quality standards, ecological indicators, etc. The management plans and action programmes established to ensure good environmental or ecological status should implement such standards, and direct operative regulatory authorities on how to further implement and enforce them. These documents should be considered in the regulation of sewerage facilities and treatment plants, as decision-making materials. It is also clearly stated, for example in General Guidance 2006:9 regarding individual sewerage facilities, that stricter requirements than normally considered reasonable, can be motivated to implement the management plans. The implementation and enforcement of ecological standards of this kind is, however, dependant on translation and operationalization of them through regulation of limit values and choice of technical solutions, etc.

3.4.3 Adaptive Regulation of Sewage Treatment Systems

There are some indications of regulation of sewerage systems adaptive to the status of the ecological systems. The differentiation in regulation of nitrogen reduction standards for treatment plants affecting the sea basins north and south of Ålands hav can be interpreted as adaptive. The marine environment south of Åland is more sensitive to nitrogen pollution, and the status of the marine environment when it comes to eutrophication is also worse here. When it comes to general guidance (2006:7) on regulation of individual sewerage systems, the assessment of the sensitivity of the affected area is more refined. The guidance recommends that the regulator relates regulation in every individual case and for every individual facility to “normal” or “high” level of protection, and thus prescribing stricter precautionary measures to achieve “high” level of protection. The criteria for demanding high level of protection all rest on the sensitivity of the recipient or surroundings, including negative effects on protected interests according to the water management system. Aside from this, regulation through either permit conditions or administrative enforcement

orders, should always meet specifically sensitive situations, in that that stricter standards and further precautionary measures than generally prescribed in general legislation, and in regulatory praxis, etc., can be motivated with regard to the status and sensitivity of the environmental conditions concerned in the individual case – topically the status of the affected ecosystems. This also affects the balancing of interests in regulation, so that further, more expensive and more intrusive precautionary measures can be deemed reasonable when the environmental interest so motivates.

3.4.4 Stakeholder Involvement in Regulation of Sewage Treatment Systems

There are indications of stakeholder involvement in development of management policy and different kinds of plans and measures regarding regulation and management of the sewage treatment systems, especially involvement of business stakeholders, such as considering statements from manufacturers and entrepreneurs in small scale sewerage treatment, in a SwAM investigation for the government, regarding policy measures to improve regulation of small scale sewerage systems,[162] and business organisations and operators of municipal treatment plants in surveys and seminars, etc., in an EPA investigation for the government and in cooperation with SwAM and Water Authorities, regarding policy measures to reduce nutrient emissions from municipal treatment plants.[163] Other stakeholders such as individual consumers connected to municipal sewerage systems, or owners of private sewerage systems, or environmental organisations, etc., are not that much involved in these investigations.

Stakeholder involvement in regulatory procedure is basically similar for all environmental regulation, including regulation of sewerage facilities. A rather wide scope of stakeholder involvement in regulation of sewage treatment systems is generally found within permit procedures, including the EIA-procedure for larger treatment plants. But, such procedures will not be that common in a system with a fairly well established system of old operations with already valid permits. Furthermore, the initiative for updating permits in a renewed process

[162] *Enskilda avlopp – Styrmedel för att nå en hållbar åtgärdstakt.* SwAM Report to the Enviromental Ministry (Dnr 5535-12), 25 February 2013, p. 5.
[163] EPA, Rapport 6521, *Styrmedel för ökad rening vid kommunala reningsverk* p. 24 and Annex 5.1.

is as a rule up to the regulatory authorities – or the operators. Such initiatives are quite rare.

Supervision and control of sewerage treatment facilities, under permit regulation or under general law, has traditionally been a matter for the regulatory authority and the operator, but directly affected individuals, primarily neighbours of the plants should be involved in the regulatory procedure, at least when they are known to the authority. Notably, as described earlier, in section 3.2.3.4, concerned stakeholders can trigger the administrative enforcement authorities duties to take regulatory action, and to deliver an administrative decision that can be appealed by concerned parties. This provides some access for a range of stakeholders.

It should also be noted that the so-called "ex officio principle" requires the authorities, including courts, to ensure proper investigation to be able to make a fully informed, correct and appropriate decision. This includes a duty to take in information relevant to the case, not only from the parties of a case, but from any stakeholder or other source. This way, a very wide range of stakeholders may well be involved in decision-making procedures, even when they are not considered parties to the case. The problem is only to know that there is an on-going case. Permit applications and procedures are often advertised and opened to statements from stakeholders, but other procedures are not, and only the directly affected stakeholders and specifically prescribed subjects are invited to participate according to the formal procedural rules. This demands activity for stakeholders.

3.4.5 Regulatory Responsiveness and Sewerage

It seems permit conditions with regard to sewerage treatment systems are often focused on technical solutions and reduction standards, which do not ensure flexibility with regard to potential worsening of ecological status. I have only found reference to conditions based on a stabile environmental situation. According to the Environmental Code, permit regulation can be reviewed and adjusted if necessitated by poor ecological standards. As a rule, a permit decision under MB 9:6 protects the permit holder against further claims or regulations in matters regulated in the permit (MB 24:1). The permit may be reviewed or even revoked under certain conditions specified in MB 24:3 and 5. Review can take place if the permit is more than 10 years old, if an environmental quality norm is breached, if nuisance of some significance, that was not foreseen when the permit was given, has oc-

curred, if the situation in the operation's surrounding, if use of better process or treatment technology can lead to significant improvements from environmental or health perspectives, etc. Review of conditions can, however, not be so intrusive that the operation can no longer be pursued or is significantly hampered. A permit can also be revoked, MB 24:3, but such relocation is under strict limitations, and very rare indeed, and cannot be viewed as a useful tool for flexibility or responsiveness in an ecosystems based regulation of sewerage.

Review of permit conditions may be initiated only by the operator or by the EPA, the Legal, Financial and Administrative Services Agency,[164] or the competent county administrative board. If administrative supervision and enforcement tasks have been delegated to a municipal board, they can also initiate review (MB 24:7). The matter of review and updating of permits and permit conditions has been subject to much critical debate. Permit review is very rarely carried out, and the competent authorities are not very active in initiating review, despite the fact that the Environmental Code states a duty for regulatory authorities to initiate review when necessary, and updating of permit conditions is required in several EU-directives, e.g. the Industrial Emissions Directive (IED). Reportedly, the EPA has taken two such initiatives for review since 1996.[165] The other competent authorities seem very passive.[166] Administrative enforcement authorities review initiatives are not really heard of, and in 2004 the EPA assessed that over half of environmentally hazardous activities under permit obligation according to MB 9:6 and FMH (where permit obligations where then prescribed),[167] where operated under out-dated permits – or even without valid permit.[168] The EU-commission have also brought Sweden to the ECJ, where Sweden was held to have failed to fulfil its duties to ensure updating of permit regulation under the IPPC.[169] One

[164] In Swedish: "Kammarkollegiet" (a central agency that *inter alia* represent public interests in the context of water law regulation). See, further: www.kammarkollegiet.se.
[165] Eca Chemicals in Bohus 1996 (MÖD 2010:49), and Landvetter airport 2005 (MÖD 2009:46).
[166] During 2006–2007, county administrative boards were required by the Government to report on their review initiatives. The reports showed very low activity. Moreover, a survey of court cases from December 2002 and June 2003, carried out in context of review of the Environmental Code, found no review cases under MB 24:5 at all, see SOU 2004:37 s. 329. See further: Darpö, Jan, *Rätt tillstånd för miljön*, 2010 pp. 64 and 136, and SOU 2011:86 p. 241.
[167] Today, permit and notification obligations are specified in the Ordinance (2013:251) on Environmental Assessment (MPF).
[168] EPA, Rapport 5353, *Att pröva eller inte pröva? Förslag till ändringar i förordningen (1998:899) om miljöfarlig verksamhet och hälsoskydd* p. 24.
[169] Commission v. Sweden in Case C 607/10.

reason for the failing initiative from the competent authorities is the extensive and expensive character of the review procedure. One of the documented EPA initiatives has been reported to have required the equivalent of 50 weeks full time work for one civil servant.[170] For a municipal environmental board or a county administrative board, it will hardly ever be possible to allocate such resources to one case.

Earlier case law held that concerned parties could not trigger an administrative enforcement authority's duties to initiate review trough a complaint to the authority,[171] in the same way as in the above described case law and praxis on triggering enforcement duties. However, in view of recent development on the law on access to justice in environmental matters, recent case law holds that a concerned party (a neighbour of an environmentally hazardous activity) may appeal an authority's decision not to initiate review.[172] This means that directly affected individuals can trigger the competent enforcement authority's duties to initiate review of permit conditions, and appeal a decision of the authority not to take such initiative. That provides much better prospects for stakeholder participation in regulation of the larger treatment plants, and it may provide better prospects for responsive review of out-dated permit conditions. To date, however, responsiveness to poor ecological status is possible mainly in theory, but hardly ever realised in practice, when it comes to permit regulated activities.

Licensing of individual sewerage facilities is different. These are not strictly covered by the same assurances against future regulatory changes. However, even though administrative enforcement authorities have extensive competences to respond to poor ecological status through regulatory measures towards, mainly, property owners with private sewerage within the relevant area, the described regulatory challenges (section 3.3.3.3) entail slow responsiveness in practice.

3.5 Concluding and Summarising Remarks

In summary, the Swedish system for regulating nutrients emissions from sewerage systems is quite well developed. It nevertheless rests heavily on general rules of consideration, regulated through permit decisions and administrative enforcement. The general rules provide a

[170] See: SOU 2011:86 p. 241, with reference to SOU 2008:62 p. 260.
[171] MÖD 2000:49.
[172] MÖD 2011: 46.

lot of flexibility and room for adaptive regulatory management, and the regulatory authorities formally have extensive competences to ensure strict but also flexible regulation of nutrient emissions. Nevertheless, compliance seems to be problematic. For treatment plants, especially nitrogen reduction standards seem hard to achieve. Regarding individual sewerage systems, as much as 40 % are thought not to be up to standard. In follow up of Swedish environmental objectives and international undertakings with regard to nutrient emissions and abatement of eutrophication also holds that the aims will not be achieved, and that a mail measure to turn this around is to actually implement and enforce the current standards and norms more effectively and efficiently. Nevertheless, recent reports regarding policy instruments and regulatory campaigns for reducing nutrient emissions reflect widespread views of inherent regulatory challenges. Some of these arguments suggest problems with social acceptance and financial reasonableness, rather than legal challenges. While certainly important for effective and appropriate management, such non-legal drivers are not investigated in more detail in this report.

4 Regulation of Nutrients Pollution from Agriculture

4.1 Introduction

According to the PLC-5, arable lands constitute the dominant Swedish source of nutrient input. Even though forestry stands for considerable loads as well, noting the highest net nitrogen load, these emissions are to a large extent not directly connected to human activities. Agriculture is the largest anthropogenic sources of nutrients pollution, and also stands for the greatest gross and net loads overall, with the exception of net nitrogen. Out of a total gross load of 162 000 tonnes/year, and a total net load of 120 900 tonnes/year, the gross nitrogen load from arable lands is estimated at 52 700 tonnes/year, and the net load at 24 400 tonnes/year in 2006. The gross phosphorous load is estimated at 1 590 tonnes/year, and the net load at 1010 tonnes/year.[173]

4.1.1 The Rural Development Programme 2007–2013

The Rural Development Programme[174] is a central Swedish policy document for realising agricultural policy. It states goals and priorities for agricultural development, and investments for rural development, financed by both Sweden and the EU. The overarching goal is sustainable development from ecological as well as economic and social perspectives. This goal encompasses sustainable food production, creation of rural employment, due regard for regional conditions, and sustainable growth. The programme further aims to safeguard natural and cultural values in the landscape and keeping environmental impact to a minimum. Rural development policy is closely linked to forestry and

[173] See EPA, Rapport 5815 *Näringsbelastning på Östersjön och Västerhavet 2006* p. 13.
[174] ("Landsbygdsprogrammet"). For further information go the Board of Agriculture webpage: http://www.jordbruksverket.se/amnesomraden/landsbygdsutveckling/visionerochprogram/landsbygdsprogrammet20072013.4.58f2066813fc03d6a206a1.html. Available in English at: http://www.regeringen.se/content/1/c6/08/27/31/de111eed.pdf.

development policy, but also and environmental protection, and to the national Environmental Quality Goals.[175]

The Rural Development Programme for 2007–2013 was amended in 2010, with the view of strengthening the measures for improving water quality. The programme involves measures providing economic incentives and enhancing knowledge. Centrally, the programme provides financial support and reimbursement of costs for environmental protection measures. Some measures for reducing nutrient leakage include: investment aid for dams for separating phosphorous, financial support for keeping protective zones, compensation possibilities for planting catch crops and/or for spring (instead of autumn) cultivation, as well as further strengthening of information and knowledge enhancing work and competence building.[176]

One very important project comprises a service called "Focus on Nutrients",[177] which provides free advice to farmers on practical measures to controlling nutrients to protect water quality. The project is managed and operated by the Board of Agriculture, the Farmers Union (LRF), county administrative boards, and a range of private firms, and financed by the EU, the Swedish government, and the farmers themselves (by about 25 million SEK/year). This voluntary information service has, according to LRF been very popular among farmers. About 200 consultants have made 27 000 house calls to talk about suitable measures in the farmers' own context.[178]

4.1.2 The Swedish Action Programme for Reduction of Nutrient Losses from Agriculture

Ever since the 1980s when the eutrophication problems were starting to receive attention, there have been Swedish action plans for reducing nutrient losses from agriculture. The Action Programme for Reduction of Nutrient Losses from Agriculture focuses on nitrogen losses, but also comprises measures to reduce leakage of phosphorous and ammonia from agriculture. The action programme is based in interna-

[175] Rural Development Programme for Sweden – the period 2007–2013 p. 62.
[176] Rural Development Programme for Sweden – the period 2007–2013 pp. 187ff.
[177] ("Greppa näringen") For further information go to the Focus on Nutrients web page: http://www.greppa.nu/omgreppa/omwebbplatsen/inenglish.4.32b12c7f12940112a7c800022239.html.
[178] LRF, *Vattenvård i lantbruket. Vad gör svenska lantbrukare för att sjöar, åar, hav och grundvattnet ska bli renare?* p. 9.

tional agreements and the national environmental objectives,[179] and it implements good agricultural practice norms from international, EU, and national law. The programme involves regulatory measures, steering through economic incentives, or information and advice campaigns, but also test areas and development projects. The largest and most far-reaching measures have focused at areas designated as vulnerable in relation to nitrogen pollution of waters (see 4.3.2).[180]

The programme is continuously reviewed with regard to new knowledge and demands. Recently the Swedish authorities have moved towards combining action programmes for the reduction of nutrient losses and of greenhouse gas emissions within the agricultural sector. The current action programme for 2011–2013 thus covers both these areas. According to the current action programme, the focus is on voluntary measures.[181] There is nevertheless extensive regulation of the matter. Instruments handled in the action programmes are regulation concerning for example storage and spreading of manure, winter crops, etc. under the Environmental Code and subsidiary legislation, as well as voluntary schemes for example information campaigns such as Focus on Nutrients and different kinds of financial support schemes within the Swedish Rural Development Programme.

4.1.3 Marine Environment Policy

Recently developed strategic and comprehensive marine policy for Sweden focuses much of the planned action aimed at reducing marine eutrophication to the agricultural area. It is held that agriculture stands for the larges share of the collected Swedish emissions to the sea, but also that agriculture is seriously involved in achieving the Swedish reduction undertakings. The government sustains, in its comprehensive marine policy,[182] that further regulatory measures must be introduced in order to reduce nitrogen loads. The government develops further such measures in its government policy paper on measures to realise the marine policy. Among other things, regulation of use of fertilisers in agriculture has been further and more strictly regulated, following criticism from the Commission regarding the fulfilment of

[179] As noted above under chapter 2, describing the implementation of Swedish obligations under international law.
[180] Jordbruksverket, *Åtgärdsprogrammet mot växtnäringsförluster från jordbruket*, 2006 p. 2.
[181] Jordbruksverket, Rapport 2010:10 *Minskade växtnäringsförluster och växthusgasutsläpp till 2016 – förslag till handlingsprogram för jordbruket.*
[182] Prop. 2008/09:170.

the nitrated directive. Information campaigns, advisory services and financial support for technological improvement, cultivating catch crops, and saving protective zones, etc. are also included in the measures. Much of this is found in the Rural Development Programme 2007–2013. In its policy paper on measures to realise the marine policy, the government stated an expected reduction of yearly loads of between 1600 and 2100 tonnes of nitrogen and about 30 tonnes of phosphorous with measures introduced (as of 2010) in the Rural Development Programme.[183]

The government policy paper on marine policy measures to reduce eutrophication also directs the supervisory and enforcing administrative authorities to focus their regulatory work on controlling the agricultural operations self-supervision. The Board of Agriculture is thus instructed to analyse and implement measures to strengthen a control system based on the agricultural operators own self-supervision and control and to coordinate it better with advisory measures. This task is to be carried out in consultation with other concerned authorities, municipalities and organisations, which may partly be seen as an expression of an ecosystems approach with the involving of stakeholders.[184]

The regulatory system regarding nutrients emissions from agriculture should not be claimed to reflect a systematic ecosystems approach. A main feature of agricultural policy and regulation, however, is a quite broad stakeholder involvement. For example, the information and consultation services provided in the project Focus on Nutrients involves interconnected stakeholders at different levels of society (central as well as regional authorities, the Farmers' union, private firms and farmers, and supported by both the Swedish government and the EU), in collaboration to protect mutual interests.

4.2 Regulation of Farms

4.2.1 Obligatory Licensing or Notification

Chapter 9 of the Environmental Code regulates so called environmentally hazardous activities. Centrally, these rules provide, in section 6, grounds for lower level legislation on obligatory licensing and notifi-

[183] Skr. 2009/10:213 pp. 37ff.
[184] Ibid. p. 43.

cation before establishing, operating, emitting waste water, etc., and also changing previously licensed installations. Based on this, and the Ordinance (2013:251) on environmental assessment (MPF) sets up a system for pre-assessment of new and changed agricultural activities of more substantive environmental impact. In MPF obligatory licensing is prescribed, in 1:3–4 §§, and in chapter 2 sections 1–2, for large live stock farms – for example large pig farms with room for over 2000 pigs for slaughter or over 750 soughs, or milk farms with over 400 cows. Some slightly smaller, but still large farms, for example milk farms with over 100 cows, are under notification obligation, in 1:10–11, and 2:3. Such installations must be notified to the enforcement authority and wait 6 weeks for their response before the installation can be established or operated. Cultivation of other land than farmland for agricultural production for example food or animal feed must also be notified to the competent authority, see 2:4.

The referred licensing and notification obligations parallel rules on agricultural activities in the Helsinki Convention, more specifically prescribing permit requirements and a simplified permit procedure, respectively, for large livestock production farms. The Helsinki Convention also prescribes in Art 6.3 a general responsibility for the parties to ensure that harmful substances are not introduced to the marine environment without prior special permit, which is to be periodically reviewed and relevantly monitored and controlled.

4.2.2 Supervision and Enforcement

Supervision and enforcement of agricultural activities pertain to pollution as well as land use. The supervision and enforcement competences are therefore described from different perspectives. Generally, according to the Administrative Enforcement Ordinance (2011:13) (MtiF) 2:8, the county administrative boards control maintenance of cultivated lands and other agricultural land use under the law on nature and species conservation (MB chapters 7–8), as well as general rules on environmental care in agriculture (MB chapter 12). Moreover, and similarly to sewerage treatment systems described above, agricultural activities are regulated under the rules on environmentally hazardous activities and protection of human health in MB chapter 9. Supervision and enforcement of permit conditions and general rules of environmental law for hazardous activities are therefore basically the competence of the county administrative boards and the municipal environment boards, according to MB 26:3, and MtiF 2:29. The main

organisational idea is that licenced activities are supervised and enforced by county administrative boards, while environment boards enforce the non-licenced activities. In reality, much enforcement of permitted activities is delegated to environment boards.[185] The Swedish Board of Agriculture acts as the central supervisory authority, providing guidance to operative supervision and enforcement in matters of livestock farming, agriculture and horticulture, as well as on their regulation on pesticides and waste management, see MtiF 3:13.

For their supervision and enforcement of environmental law, operative enforcement authorities use the general enforcement instruments mainly prescribed in MB chapter 26, and described above in 3.2.3.4.

4.2.3 Rules on Location of Agricultural Activities

Part II of Annex III of the Helsinki Convention regulates generally the location and design of farm animal houses, stating that they should be located and designed in such a way that ground and surface water will not be polluted. This rule is implemented in Swedish law through land use management, physical planning and building law, and in general rules and principles on best localisation. There is, however, no such specific rule on localisation of farm animal houses.

Suitable and best possible location is generally required under MB 2:6. This rule is applied mainly in planning and in different kinds of permit procedures. Suitability is assessed with regard to fulfilling the aim of the relevant activity with minimum intrusion and nuisance for human health and environment. In relation to this general rule, MB chapters 3 and 4 lay down general rules for land use and management of natural resources and guidelines for balancing of the interests involved. Among such interests are both sensitive areas and agricultural lands. It is held that agriculture and forestry are of national importance, and that agricultural land that is suitable for cultivation should be saved from development or building purposes, unless necessary to protect other significant national interests (MB 3:4). This rule does not provide much guidance for regulating location in order to reduce nutrient emissions, or other pollution, etc. It is, however also prescribed that land and water areas that are particularly vulnerable

[185] Such delegation of powers is supported by MB 6:3 para. 4, and by MtiF. The county administrative boards are to some extent mandated, or obligated even, to take back the enforcement competence delegated to the municipalities. In practice this would require severe maladministration, and such return of delegation of powers is generally never done (see MB 26:4, the MtiF 1:21–22; and Prop. 2002/03:54).

from an ecological perspective shall, to the extent possible, be protected against measures that may damage the natural environment (MB 3:3). In this way, ecological interests can be balanced against agricultural interests.

Planning land use and building is fundamentally a municipal domain. The municipalities enjoy wide autonomy, but must consider and ensure private and public interests prescribed in the planning and building act, with reference also to the above-described rules of the Environmental Code on land use and resource management, and the national interests reflected therein. The municipalities should therefore consider the interests of agriculture as well as ecological vulnerability, etc., in their planning procedures, and in that promote sustainable development. This is prescribed in the Planning and Building Act (2010:900) (PBL) chapters 1 and 2. Such planning consideration can be seen, for example in comprehensive plans ("översiktsplaner") stating general land use planning for the whole municipality, and detailed building plans ("detaljplaner") prescribing allowable land use and building. For example, in the comprehensive plan for Göteborg, there are supplementary plans for promoting the protection and use of existing agricultural lands and establishing routines for identifying and promotes the different interests and values in agricultural areas. The general point of departure for this is held to be environmental quality objectives for arable lands and wetlands.[186]

In detailed planning procedure, consideration of ecological status in waters and necessity for detailed building plans can often be noted. Such considerations aim to ensure protection and improvement of ecological status with regard to nutrients loads and eutrophication. When searching existing planning documents, it can be noted that while planning with regard to protecting agricultural interests is common, similar regulation to nutrient leakage from agriculture seems rare.

It should be noted that the described rules on location of agricultural activities and buildings, etc., are mainly applied in planning and permitting new activities, and generally not applied, or even applicable, in support of regulation of an existent and active agricultural activity, for example in response to poor ecological status of a recipient. To some extent existent agricultural lands are even protected against

[186] Översiktsplan för Göteborg, ÖP99 and supplements are available at: http://goteborg.se/wps/portal/invanare/bygga-o-bo/kommunens-planarbete/oversiktlig-planering.

development and changes in land use, in that agricultural lands and activities are of important national interest and saved from changes.

There are, moreover, rules on so-called vulnerable zones in relation to protection of water against nitrates pollution from agriculture. These rules are found in section 5 of the Ordinance (1998:915) on Environmental Care in Agriculture, and implement the Nitrates Directive 91/676/EEC.[187] These rules, however, do not really apply to the question of location of agricultural activities as such, or to the permissibility of an activity in such areas. Instead, the substantive rules on storage on manure, etc., will be stricter in the vulnerable areas. These rules will be described in the following.

4.3 Substantive Rules of Nutrient Pollution from Agriculture

4.3.1 General Introduction

The Environmental Code provides grounds for more specified regulation and standards of care in lower level legislation. For agriculture, MB 12:8 and 12:10 provide grounds for the government, and the administrative authority which the government prescribes, to make such legislation. This authority is generally the specialised central agency, the Swedish Board of Agriculture.

The thus empowered regulator may subsequently legislate on limits to numbers of livestock on a farm, precautionary measures for handling manure, and generally on cultivation of crops, to the extent reasonably necessary for environmental protection (12:10). They may also regulate required care for nature and cultural interests to be taken in the management of relevant land, but under a sort of guarantee for proportionality or reasonableness (12:8). The legislative competence is limited so that the rules may not be so intrusive as to create so called significant difficulties for current land use in the relevant part of the property. Flora and fauna, as well as the cultural landscape, are stated as examples of the relevantly protected interests.

The government has prescribed a central Ordinance (1998:915) on Environmental Care in Agriculture. Among other things, the ordi-

[187] Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources [1991] OJ L375/1.

nance implements the Nitrates Directive, designating (as noted above), in 5 §, large areas of the country as vulnerable zones according to the directive, and stating, in 6–10 §§, requirements for storage of manure, and, in 11 §, for autumn and winter crop cover. The Board of Agriculture is moreover given the competence to legislate further and more specific rules. The referred rules partly also implement measures and best practices prescribed under the Helsinki Convention, especially in Part II of Annex III on pollution from land-based sources, and in Recommendation 24/3 with measures aimed at the reduction of emissions from agriculture. Much of these rules are, however, implemented through the application of general rules of consideration, including BAT, and land use planning and land management in individual permitting or administrative enforcement decisions. Best practices are often also implemented through voluntary measures, which are not in focus in this study.

The general substantive rules described in the following are not clearly linked to substantive environmental quality standards. There is, however, a general adaptive approach in the stricter regulation for vulnerable areas, and some further differentiation in substantive regulation in different counties of Sweden, topically where nutrient leakage is more problematic.

Monitoring and control follows the general rules on supervision and control, including the actors' responsibilities for knowledge, due care, and self-supervision and control, as described thoroughly under chapter 3 (sections 3.2.3.4 and 3.2.3.6). These general rules will not be repeated in the following, but some notes will be made on more specific rules and guidelines in the context of regulation of agriculture and control of nutrient losses.

4.3.2 Vulnerable Zones

There are rules on so-called vulnerable zones, in relation to protection of water against nitrates pollution from agriculture. These are found in section 5 of the Ordinance (1998:915) on Environmental Care in Agriculture, and implement the Nitrates Directive. These areas are mainly found in the south of Sweden, especially, but not only, in proximity to coastal areas. The rules designating vulnerable areas have recently been reviewed. In this review, it was possible to consider data collected under the water management system (under the WFD). This has led to some changes, more specific designation within some Counties of the South, and the adding of areas further North than before, in Värm-

land and Dalarna. (However, the areas relevant for the assessment of waters subsequently had to be translated into areas following more administrative geographic borders, which were not always compatible. Some compromise has been made here.)

As of 1 January 2013, the vulnerable areas are the whole counties of Gotland, Stockholm and Södermanland, and the coastal areas of the counties of Stockholm, Södermanland, Östergötland, Kalmar and Västra Götaland, as well as in parts of the counties of Blekinge, Skåne and Halland. Moreover, the inland areas (not coast areas under the above) in parts of the counties of Uppsala, Östergötland, Jönköping, Västra Götaland, Värmland, Örebro, Västmanland and Dalarna are designated as vulnerable areas. The specific areas thus designated are regulated – down to the parish level – by the Board of Agriculture in their Provisions and General Recommendations (SVJFS 2004:62) on Environmental Care in Agriculture as to Fertilisers (as amended in June 2011, through SJVFS 2011:25)

4.3.3 Livestock and Storage of Manure

The Helsinki Convention prescribes in Annex III, Part II, regarding prevention of pollution from agriculture, that there must be appropriate animal density, i.e. a balance between number of animals on the farm and the amount of land available for spreading manure. This in order to ensure that excess of manure is not produced. There is no general rule in Swedish environmental law specifically delimiting the number of animals, but animal density is regulated in application of the Environmental Code general rules of consideration in administrative decision making procedures – permitting for the largest farms, and administrative enforcement decisions for the smaller farms which are not under environmental permitting obligations. Also, provisions on handling and use of manure will delimit animal density in practice.

According to Ordinance (1998:915) on Environmental Care in Agriculture, section 6, a livestock farm with more than 1000 animal units must ensure manure storage capacity for at least 8 months manure production from cattle, horses, sheep or goats, and for at least 10 months for other livestock. According to steady licensing praxis and case law, the manure storage capacity must be dimensioned to the number of animals that the relevant permit allows for, and not the actual number of animals on the farm at any given moment.[188]

[188] MÖD 2008:34.

Within vulnerable zones, the referred minimum capacity rule applies for farms of more than 10 animal units. In other parts of the country, such smaller livestock farms must ensure minimum storage capacity of 6 and 10 months respectively. Even smaller farms must ensure storage capacity for a minimum of 6 moths in vulnerable zones, but farms of no more than two animal units on average per year are, according to regulation 2004:62 section 4, exempted. The regulation further specifies, in section 4a, factors that must be included in the determination of storage volume within vulnerable zones. These factors should, according to Board of Agriculture general guidance (SVJFS 2009:82), be included where relevant also outside vulnerable zones. The guidance also provides, in Annex 7, a table of standard values for the calculation of needed storage capacity under the referred rules. In vulnerable zones, the calculation of storage volume must be documented, and the documentation must be saved and kept accessible, according to section 4 of Regulation 2004:62. Intermediate storage on the ground outside may not be included in the storage capacity, according to section 7 of the same regulation.

General guidance (2009:82) on section 6 and general rules of consideration, further recommends that storage facilities for manure be of such sixe that the manure can be stored under period and weather conditions when spreading is prohibited or inappropriate, or until the manure can be taken care of in alternative manner.

Storage facilities must, according to section 7 of the said ordinance, be constructed so that runoff or leakage does not occur. Regulation 2004:62 specifies these construction requirements further for farms of more than 10 animal units, and in certain parts of the country, especially with regard to storage covering. General guidance 2009:82 also recommends that the place for manure storage should be chosen so that potential leakage has minimum effect on the surroundings, for example ensuring that manure does not pollute ground or surface waters, and, moreover, avoiding health nuisance for neighbours, for example smell and flies.

Aside from these rules on manure storage facilities, the Board of Agriculture also provide quite specified guidance (2009:82) on intermediate storage and composting outside in the fields, based on the MB general rules of consideration and 2:3 on due care. These recommendations state limited possibilities for smaller such intermediate storage in an upset. Such storage should, for example be kept in the field where the manure is to be distributed, and only in such amounts that will be distributed there. Similar storage should not reoccur in the

same place for 5 years. Composting should, moreover, mainly be carried out during April–October.

General guidance also reminds of the self-supervision duties of the actor, basically the farmer, to continuously inspect the storage facilities so that defects can be detected and repaired so as to avoid runoff and leakage. According to MB 26:19, each relevant environmental actor must supervise and control their own installation and operation, parallel to – and in communication and cooperation with – the supervisory and enforcing duties of the competent authorities.

The described rules on manure storage well reflect and implement the corresponding requirements of the Helsinki convention.

4.3.4 Use of Fertilizer

The use of fertilizer is regulated in detail the Board of Agriculture Regulation (2004:62),[189] both with regard to the amount of fertilizer that can be applied (8–21 §§), and precautionary measures for the spreading of fertilizers (22–28 §§).

4.3.4.1 **Application rates**

Fundamentally and according to 8 § or the regulation, manure or other organic fertilizers cannot be applied in larger quantities than the equivalent of 22 kg total phosphorus per hectare spreading area and year. This is counted for a five-year consecutive period, and as an average for the whole spreading area of the farm under that period. The regulation also prescribed what lands are to be counted into the spreading area, in 18–19 §§.

In general guidance (2009:82) regarding application of the rules on self-supervision, the Board of Agriculture holds that the phosphorus amounts can be calculated using standard values or balance calculations, but not generalisation of manure analyses. The guidance provides standard values in Annex 8 and state input and output values (such as feed input and delivered products output, and analysis of phosphorus contents) that should be counted in a balance calculation. The described provision does not apply to the use of manure from the animals on very small farms (maximum ten animal units on yearly

[189] The regulation was reviewed in 2010 and amended through SJVFS 2011:25. It is based on MB 12:10, and Ordinance (1998:915) on Environmental Care in Agriculture 12 §, and implements provisions in the Nitrate Directive (91/676/EEG).

average). However, if other manure or organic fertilizer is added, the rule applies to the addition, which then has to be counted.

For vulnerable areas the Board of Agriculture Regulation (2004:62) prescribes, in 19 a §, that no more manure fertilizer can be applied than that equivalent of 170 kg total nitrogen per hectare of spreading area and year. Some rules and guidance on calculation of nitrogen contents are also provided. Fundamentally also, 20 § of the regulation prescribes that within vulnerable areas, nitrogen supply through fertilizer must be limited so as not to exceed the amounts needed by the intended crops in the relevant site. The regulation provides factors to be counted in this assessment in Annex 6. General guidance also provides standard values, in Annexes 10–12, to facilitate the assessment. General guidance also recommends that considerations similar to the binding rule in the Board of Agriculture Regulation 20 § are applied generally and not only in vulnerable areas.

These rules are comparable to the Helsinki Convention's rules on prevention of pollution from agriculture, that require balanced application rates and guidelines on the calculation of such balance.

Another relevant substantive rule is found in the Board of Agriculture Regulation (2004:62) 19 b §, which states that within vulnerable areas, no more than 60 kg accessible nitrogen per hectare can be applied before autumn sowing of oilseed, and no more than 40 kg for other crops. The amount must be tailored to the crops' needs in autumn. General guidance provides standard values in Annex 10 that can be used for this assessment, but other analysis can be used also.

Aside from guidance on calculation of phosphorus and nitrogen loads etc. in context of farmers' self-supervision, the general guidance also recommends that croplands are mapped on a regular basis for assessment of its phosphorus content, and provides recommended intervals for sampling. A farmer should document and be able to produce information on how the crops' nitrogen requirement is calculated and what fertilizing has been carried out. This guidance is clearly aimed at facilitating monitoring and control for all involved parties. The guidance also advises on how to handle difficulties in calculating phosphorous for manure, etc., and consequent over-fertilizing. Regulation (2004:62) also prescribes, in 13–14 §§, detailed documentation duties for farms receiving and delivering manure to and from others.

4.3.4.2 **Precautionary Measures when Spreading Fertilizers**

The Board of Agriculture Regulation (2004:62) provides specified precautionary measures for when and where to spread fertilizers, es-

pecially for vulnerable areas. Generally, mineral fertilizers containing urea spread on bare lands must be worked into the soil within 4 hours of spreading, 23 §, and for areas outside vulnerable areas manure and other organic fertilizers spread from 1 December through 28 February must be worked into the soil within 12 hours, 23 a §. General guidance (2009:82) recommends that manure fertilizers be upon spreading worked into the soil where and as soon as possible.

For vulnerable areas the precautionary measures are more elaborated. Here no fertilizers at all may be spread between 1 November and 28 February, 25 §, and fertilizers may never be spread on water-saturated or flooded lands, or on snow covered or frozen lands, 24 §. In the southernmost vulnerable areas there are even further restrictions regarding autumn fertilizing in 26 §. 27–28 c §§ also prescribes stricter regulation on time periods, spreading methods, and rules on working in fertilizer into the soil, etc. for different parts of the country.

Furthermore, with regard to vulnerable areas, fertilizer must not be spread within 2 meters of a stream or a lake, or on lands sloping towards such water, 24 a–b §§. In general guidance (2009:82) the Board of Agriculture recommends that similar considerations to those in 24–24 b §§ be taken also outside vulnerable areas. Moreover, the guidance provide general recommendations on best method and timing for spreading fertilizers, so that the uptake by the crops are optimised and at the same time leaking is avoided. In addition to this, the Board of Agriculture Regulation (SJVFS 1999:119)[190] on Due Care for Nature and Cultural Values in Agriculture, prescribes, in 10 §, that fertilizer cannot be spread in such a manner that it spills over outside the crop lands, and also, in 11 §, that fertilizer cannot be spread on to meadow or grazing lands if that could harm nature or cultural interests.

Generally guidance also recommend that machines for spreading fertilizers are checked and adjusted so that they can spread fertiliser in intended quantities and best possible precision. The person operating the spreader should be familiar to the relevant functions and performance of the machinery.

4.3.5 Autumn and Winter Crop Cover, Spring Tillage

According to Ordinance (1998:915) on environmental care in agriculture, section 11, farms with more than 5 ha of croplands, in the south-

[190] Statens jordbruksverks föreskrifter (SVJFS 1999:119) om hänsyn till natur- och kulturvärden i jordbruket, last amended through (SJVFS 2006:17).

ernmost counties Blekinge, Skåne and Halland, must ensure at least 60 % autumn or winter crop cover. This number is 50 % in some other southern counties, comprising Östergötland, Jönköping, Kronoberg, Kalmar, Gotland and Västra Götaland. Crops that are approved for autumn and winter crops are specified in the Board of Agriculture Regulation (2004:62) section 29, and include for example sugar beats, winter cereals and catch crops. Dates for last sowing and earliest interruption of growth are also specified in the regulation, sections 32–33. Fields that have not been processed after harvest of cereal, etc. may under some circumstances be considered autumn or winter crop covered, according to section 30.

It should be noted that financial policy instruments and voluntary measures are central in this context. Through the rural development and nutrient leakage abatement policies described in the above (4.1.1-4.1.2) there are substantial schemes for subsidies, or economic compensation for the farmers' environmental measures, aimed at reducing nutrient losses from agriculture. So-called environmental compensation can be granted following a farmer's commitment to an agreement, and specified conditions, of growing catch crops and/or spring tilling, but also for maintaining wet lands, and protective zones.[191]

These rules reflect measures recommended in Part II of Annex III of the Helsinki Convention.

4.4 Ecosystems Approach and Regulation of Agriculture?

4.4.1 Introduction

As noted in the beginning of this chapter, Swedish environmental regulation of agriculture is not systematically and coherently based on ecosystems management. Environmental protection, and regulation of nutrient leakage in particular, is a very important political goal and strategic aim, promoted and supported by comprehensive strategic policy documents and action programmes. Relevant management to a large extent rely on voluntary measures such as information cam-

[191] See: Jordbruksverket, Rapport 2010:10, *Minskade växtnäringsförluster och växthusgasutsläpp till 2016 – förslag till handlingsprogram för jordbruket*., the *Rural Development Programme for Sweden – the period 2007–2013*.

paigns, information and consultation services – centrally the Focus on Nutrients project – and financial policy instruments such as schemes for subsidies and compensation for environmental measures in agriculture. When it comes to regulation, the rules on environmental care are very much focused on storage facilities for manure, and on calculating when, how, and how much fertilizer can be spread on to the fields. The rules are stricter and more detailed in so called vulnerable zones, where nutrient leakage is most problematic. Sometimes, regulation is also differentiated in different vulnerable areas. General guidance from the Board of Agriculture, however, recommends the stricter rules be considered also in other areas.

4.4.2 Ecological standards in regulation agriculture

Ecological standards are not expressed in environmental regulation of agriculture, and this investigation has shown that ecological standards are not directly applied in regulation of individual agricultural activities. Substantive norms regarding environmental protection in agriculture are formulated as time periods and methods for applying fertilisers, rates of applied fertilizers (nutrients/hectare), including some rules on how to calculate the rates. In individual regulation localisation of the stalls, animal density, etc. will also be regulated. Water quality norms and indicators and other ecological standards should serve as basis for such regulation in individual cases, and for strategic agricultural policy and action programmes.

Indirectly, ecological standards and indications of ecological status will serve as basis for environmental regulation of agriculture, as the information and norms from water management planning will largely determine designation of vulnerable areas. In these vulnerable areas the rules on precautionary measures in agriculture are substantively stricter. This zoning should also reflect in stricter application of more general rules of due care in individual cases, but that will fall under the discretion of the individual decision-maker. Moreover, it will normally be challenging for the competent administrative authority to motivate requirements on the individual farmer to monitor ecological status, such as nutrient levels and other water quality, at least when there are several contributors of nutrient emissions to the water. Such demands could be considered disproportionate and unreasonable for the individual farmer to control. From an environmental management point of view, however, a collective responsibility for contributors of diffuse emissions seems most relevant. However, general principles of

law will not allow for administrative orders directed at a collective of polluter. An order must specify individual duties and thus make it possible for the addressee to see what he must do to avoid further enforcement, and case law has shown that the fulfilment of these duties must not be left dependent on other individuals in a collective.

4.4.3 Adaptiveness

The Swedish legislation regulating agriculture does not expressly prescribe adaptiveness to ecological systems, other than the differentiated regulation in vulnerable zones and outside. To some extent also the vulnerable zones are further differentiated. This zoning is, as mentioned above, based on information on ecosystem approach and ecological status, mainly through the water management system.

Furthermore, regulation in the individual case – through permitting and administrative enforcement – should reflect ecosystem adaptiveness through appropriate application of general rules on consideration so that environmental objectives of the regulatory system are achieved. There is nothing to indicate that such adaptive regulation is not carried out in the individual case, and general guidance reflects a norm of such regulation. However, a clear norm or jurisprudence on adaptive regulation is difficult to find or to control. Adaptive regulation will therefore be left to the discretion of each decision maker.

Moreover, much of the more extensive environmental measures in agriculture are left to voluntary schemes, so that management will adapt to the willingness – and perhaps the knowledge, skills and other resources – of the individual farmer, and not to the ecosystem needs and functions.

4.4.4 Involving different stakeholders

Different stakeholders are very much involved in development of the central policy documents and programmes connected to agriculture and environment. For example, the current rural development plan was developed in a comprehensive procedure, starting in 2004 and involving numerous consultation meetings and review assignments, etc. After proposals for long term strategy for the policy, and compilation by the Board of Agriculture of technical data to base drafting of the programme, and monitoring, discussion and comments from a reference group of different stakeholders, the Agricultural Ministry during 2005–2006 also held regular bilateral meetings with representa-

tives of public authorities, the non-profit sector and the business community, for example: Centrum för biologisk mångfald (the Centre of Biodiversity), Landorganisationen (the Trade Union Confederation, LO), Lantbrukarnas Riksförbund (the Farmers' Union, LRF), Sametinget (the Sami Parliament), Naturskyddsföreningen (the Society for Nature Conservation), Sveriges Kommuner och Landsting (the Swedish Association for Local Authorities and Regions, SKL), Svensk Mjölk (the Swedish Dairy Association), and many more. The meetings provided a forum for more detailed discussion of the form and content of the Rural Development Programme. The participating organisations were given the opportunity to share their views and experience. In the winter of 2005 – 2006, there were also regional meetings organised by the County Administrative Boards of Norrbotten, Kalmar, Västra Götaland and Värmland (basically in the north, southeast, west and southwest of the country), with the purpose of presenting the preliminary strategy and programme proposals, and to give regional actors opportunity to comment and to highlight specific regional or county issues that should be considered. These regional meetings were each attended by 25-40 representative of regional stakeholder groups, municipalities, county councils and government agencies. The meetings resulted in specific and practical suggestions from farmers and other agricultural actors. Further work has also been made to strengthen the regional and local leverage on the implementation process.[192]

It should also be noted that the agricultural area is generally one where best practices, also with regard to environmental protection, etc., is very much left to voluntary policy instruments. To a great extent environmental measures are taken within compensation programmes under the Rural Development Programme, involving voluntary agreements between each farmer and the public authorities. Another important and very popular policy instrument is the information and consultation service provided in Focus on Nutrients, where individual farmers are able to communicate and learn how to take measures to control nutrient leakage, etc. Through this voluntary policy strategy, the individual stakeholders are very much involved in management pertaining to nutrient emissions and agriculture.

When it comes to regulatory procedure, stakeholder involvement is, as noted previously (see 3.4.4), basically similar for all environmental regulation. A rather wide scope of stakeholder involvement is found

[192] Rural Development Programme for Sweden – the period 2007–2013 pp. 290 ff.

within permit procedures, including the EIA-procedure. However, only the most polluting agricultural operations, mainly large livestock farms, falls under obligatory permitting, and then only when the operation is established, substantively changed, or updated or renewed. Such procedures will not be that common in a system with a fairly well established system of old operations with already valid permits. Furthermore, the initiative for updating permits in a renewed process is as a rule up to the regulatory authorities – or the operators. Such initiatives are still quite rare.

As noted earlier, supervision and control of sewerage treatment facilities should involve directly affected individuals, at least neighbours. However, such regulation is generally mainly a matter between the authority and the operator – the farmer. Notably, as described earlier, in section 3.2.3.4, concerned stakeholders can trigger the administrative enforcement authorities duties to take regulatory action and deliver a decision that can be appealed by concerned parties. This provides some access for a range of stakeholders.

It should also be noted that the so called “ex officio principle” includes a duty to take in information relevant to the case, not only from the parties of a case, but from any stakeholder or other source. This means that a wide range of stakeholders may well be involved in decision-making procedures, even when they are not considered directly concerned, or otherwise parties to the case. The challenge for those wanting to participate in this way is that they must find out about what cases the authorities are working on. Such information is not always published, and the stakeholders will have to search for the information themselves. In practice, this curbs such wider participation.

4.4.5 Legal measures in response to poor ecological status

Similarly as for permits for sewage water treatment plants (see 3.4.5) environmental permits for farms can be reviewed the activity is contributing to environmental quality norms not being fulfilled, or if in other ways necessitated by poor ecological status. Permit conditions can also be reviewed if the permit is more than 10 years old. The review can, however, not be so intrusive that the operation can no longer be pursued or is significantly hampered. Review of permit conditions is regulated MB 24:5. There is also very limited possibilities for revoking a permit, for example if the activity leads to significant nuisance which could not be predicted when permitting it, or if necessary to fulfil Sweden’s duties under EU-law, MB 24:3. Such revocation is

hardly ever carried out, and also permit review in response to environmental problems is rare. No case law of review or revocation of a permit for agricultural activity, in response to poor ecological status has been identified in this study.

As noted earlier, review of permit conditions can, as a rule, be initiated only by the operator or by a few specified public authorities (MB 24:7). The matter of review and updating of permits and permit conditions has been subject to much critical debate (see 3.4.5). Recent case law development on access to justice in environmental matters has meant that a concerned party (a neighbour of an environmentally hazardous activity) may appeal an administrative authority's decision not to initiate review.[193] This means that directly affected individuals can trigger the competent enforcement authority's duties to initiate review of permit conditions, and appeal a decision of the authority not to take such initiative. In summary, however, responsiveness to poor ecological status is possible but rarely realised in practice, when it comes to permit regulated activities. For agriculture only the largest livestock farms are under permit regulation. For most farms regulation is left to the administrative enforcement authorities. This means that responsiveness to poor ecological status is procedurally much simpler and easier. It has not been possible in this study to investigate fully how well such responsiveness is carried out. It is difficult to find indication of such practice. Similarly to adaptive regulation, the realisation of such policy ideals is much left to the individual enforcers, and not easily controlled by central authorities or the public.

4.5 Concluding and Summarising Remarks

In summary, agricultural policy relating to environmental protection is well developed in Sweden, and policy development and realisation very much involve a wide range of stakeholders. Environmental management pertaining to nutrient emissions from agriculture is in Sweden much left to voluntary schemes. These schemes involve information and consultation services to farmers and voluntary agreements on environmental measures supported – and driven – by monetary compensation schemes. The largest agricultural activities, mainly large livestock farms, are under environmental permit obligation, and thus regulated in detail in permit conditions. Most farms, however, are

[193] MÖD 2011: 46.

regulated in supervision and administrative enforcement decisions, most often by the local authorities. Substantive environmental standards differentiate between vulnerable areas and outside. Specific substantive rules on environmental care in agriculture comprise mainly regulation of manure storage facilities and the rates and methods for spreading fertilizers, stating stricter and more detailed rules within vulnerable areas. Environmental quality norms or ecological standards of different kinds do not seem to be directly applied in this regulation, but should influence the interpretation and application of general rules of consideration in regulation in individual cases. Ecological status and quality norms also influence the vulnerable areas zoning. This way regulation is to some extent adaptive. It may also respond to changed environmental circumstances and poor ecological status, but in practice the system is not very flexible. Management responses are often slow. Regulation of agriculture can thus be seen as indirectly, but not comprehensively, based in a kind of ecosystems management.

5 Water Quality – Planning and Management

5.1 Introduction

Sweden is a country with a very long coastline and a large amount of water bodies. The population is concentrated to the southern half of the country, and along the coasts. With the water management system established to implement the Water Framework Directive (WFD), Swedish waters can be seen as managed with an ecosystems approach. The water management system works with environmental standards that are fundamentally based in information and knowledge about physical, ecological and chemical circumstances of each water body. The management procedure involves stakeholders in the cycle. Moreover, the management of these waters in order to achieve at least good status is continuously adapted to the specific water characteristics, and changes in environmental circumstances.

WFD states, in art. 1, that achieving objectives of international agreements aiming to prevent and eliminate pollution of the marine environment is an objective of the directive and of the framework. The water management system does include coastal waters, as regulated under the WFD, but not marine waters further out. It can be noted that the management plans reveal awareness of the connection to marine water environment, certainly for eutrophication, and the importance of proper water management under the WFD system in order to properly manage marine waters as well. Nonetheless, marine water environment is largely outside the water management systems' scope, and it is not directly covered in the plans or action programmes.

The water districts' management plans provide information about surface and ground waters under the definition in the WFD. It should, however, be borne in mind that this leaves out the very many smaller water bodies of different kinds. With that reservation in mind, the following basic information is drawn from the water authorities' management plans for 2009–2015 and shows some general information about Swedish waters and their status.

The Skagerak and Kattegatt water district on the Swedish west coast contains 18 main drainage areas (larger than 299 km2), the larg-

est one being Göta älv, which is Sweden's largest river, and Vänern, which is Sweden's largest lake. This drainage area represents 10 % of the Swedish territory. The water district covers coastal waters off the west coast of Sweden from the Norwegian border in the north to the Danish straits in the south. It contains 2,4 million of Sweden's population of about 9 million.[194]

According to the information gathered in the first water management cycle, about 55 % of the district's streams and 36 % of the lakes do not achieve good status. Out of the districts coastal and transitional waters, 95 % does not achieve good ecological status. The predominant problem is eutrophication. The causes are found in agriculture as well as industry, and in densely populated communities along the coast. Quite some nutrient input from traffic and other air pollution is also noted, and a considerable part is imported from other countries. Measures have been taken to reduce eutrophication, especially in water treatment plants and industries, but also in agriculture. This has led to considerable reduction of nutrients emissions, especially for phosphorous, while reduction of nitrogen emissions is more challenging. It is nevertheless predicted in the management plan, that there is a risk that the ecological status of most of the inland waters and all of the coastal waters reported as not achieving good status, will not be improved by the end of the current management cycle in 2015 – and for some waters there is a risk of the status deteriorating.[195]

The South Baltic water district contains 33 main drainage areas, including the large islands of Öland and Gotland. The district covers coastal waters from the north end of the Danish straits on the west coast, to Bråviken on the southeast coast.[196] The population is about 2,2 million. About 45 % of the district's streams and lakes do not achieve good ecological status. The main problems in lakes are acidification, eutrophication and environmental toxins, and for streams it is eutrophication and physical changes. The management plan notes the eutrophication problems in marine waters, both in coastal waters and beyond. A main anthropogenic source is agriculture, but also wastewater treatment plants, industry and private sewerage installations are noted as significant sources. None of the districts coastal

[194] [194] Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavets vattendistrikt 2009–2015* pp. 25 ff, and summarised at pp. 10 ff.
[195] Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavets vattendistrikt 2009–2015* pp. 65ff., and summary at pp. 10 ff.
[196] See map at: Vattenmyndigheten Södra Östersjön, *Förvaltningsplan. Södra Östersjöns vattendistrikt 2009–2015* p. 22.

waters achieve good ecological status, mainly due to eutrophication and environmental toxins. What's more, 85 % of the inland waters and all of the coastal waters are considered in risk of not reaching good ecological status by 2015.[197] The South Baltic Water Authority's assessment of the consequences and results of the action programme 2009–2015, holds, in summary, that the leakage and the emissions of nutrients will stay unchanged or increase slightly by 2015.[198]

The North Baltic water district is the smallest water district, but it has the largest population (2,9 million) and a high pressure on water environment. It stretches into the country off the Swedish east coast from Dalälven in the north, to Bråviken in the south and includes Stockholm and several larger towns. There are 1130 surface water bodies – 340 lakes and 623 streams, 19 transitional waters, and 149 coastal waters. There are also 5 water bodies in the archipelago. The district contains 30 main drainage areas, the main one being Norrström, which runs to the Baltic Sea through lake Mälaren and the town of Södertälje.[199]

About 70 % of the North Baltic district's streams and lakes, and about 97 % of the coastal and transitional waters, do not achieve good ecological status. The main problem here is eutrophication. About 80 % of the streams and waters, and close to 100 % of the coastal and transitional waters, are considered at risk of not achieving good ecological status by 2015. Eutrophication, which is identified through analysis of biological quality indicators, is a main problem.[200] The main sources for anthropogenic nutrients input are agricultural lands and wastewater treatment plants, private sewerage, deposit of air pollution and "storm water" (surface runoff of rainwater).[201]

The Bothnian Sea water district, from the Norwegian border in the west, to the east coast, from Dalälven in the south to Leduån in the north, covers 31 % of the Swedish territory, and about a third of the lakes and streams in Sweden. At the same time the population is only 920 000. About 45 % of the district's streams and lakes do not achieve

[197] Vattenmyndigheten Södra Östersjön, *Förvaltningsplan. Södra Östersjöns vattendistrikt 2009–2015* pp. 71 f., p. 93 f., and p. 97 ff. See summary at p. 10ff.
[198] Vattenmyndigheten Södra Östersjön, *Åtgärdsprogram. Södra Östersjöns vattendistrikt 2009–2015* p. 62 f.
[199] Vattenmyndigheten Norra Östersjön, *Förvaltningsplan. Norra Östersjöns vattendistrikt 2009 2015* pp. 24 ff, and summary at pp. 5 f.
[200] Vattenmyndigheten Norra Östersjön, *Förvaltningsplan. Norra Östersjöns vattendistrikt 2009–2015* pp. 58 ff., esp. p. 70, p. 119, and summary at pp. 7 f.
[201] Vattenmyndigheten Norra Östersjön, *Förvaltningsplan. Norra Östersjöns vattendistrikt 2009–2015* pp. 99 ff. with numbers taken from PLC-5.

good ecological status. Here eutrophication is not a main problem, but rather physical changes and acidification. For coastal waters, however, the main problem is eutrophication, and the main anthropogenic sources of nutrients are industry, wastewater treatment plants, agricultural lands and private sewerages. About 40 % of the coastal waters do not achieve good ecological status.[202]

The Bothnian Bay water district is the northernmost one, covering the rest of the country north from Leduån. The district is characterised by many lakes (about 42 000), brackish seawater and a spread-out population. It is the largest of the five Swedish water districts in area, but it has the smallest pollution of 500 000 inhabitants, mainly residing in the coastal areas and river valleys. The district contains 30 main drainage areas, including the Torne River, the river basin of which extends across Sweden and Finland, as well as a small part of Norway. The Torne River is thus designated an international water district around which the countries must cooperate. The district also contains large river systems, many of them exploited for hydropower, but with four so-called national rivers protected against such exploitation.[203]

In the Bothnian Bay water district, eutrophication is not a main problem. About 23 % of the district's lakes and 32 % of the district's streams do not achieve good ecological status. Here physical obstacles for fish, such as dams, are a main problem. About 42 % of the coastal waters do not achieve good ecological status. Here, pollution through metals and environmental toxins are the main problem. A small share of the coastal waters has received a lower ecological status classification due to eutrophication, but there are some uncertainties here, due to insufficient data. The risk assessment for the Bothnian Bay district shows that 24 % of the lakes, 46 % of the streams, and 58 % of the coastal waters are predicted to be at risk of not achieving good ecological status by 2015. For coastal waters the reasons for this are mainly the reasons for this are tied to the problems of polluting substances and eutrophication.[204]

Generally, it can be also noted that none of the Swedish inland and coastal waters achieve good chemical status, due to elevated mercury levels. Aside from this dominant problem, the chemical status of Swe-

[202] Vattenmyndigheten Bottenhavet, *Förvaltningsplan. Bottenhavets vattendistrikt 2009 – 2015* pp. 28ff., pp. 79 ff., pp. 107 ff., and summary at pp. 10ff.
[203] Vattenmyndigheten Bottenviken, *Förvaltningsplan. Bottenvikens vattendistrikt 2009 – 2015* pp. 15 f., 20 ff., and summary at pp. 1 ff.
[204] Vattenmyndigheten Bottenviken, *Förvaltningsplan. Bottenvikens vattendistrikt 2009 – 2015* pp. 71 ff., 108 ff., 137, and summary at pp. 1 ff.

dish waters is generally quite good. In the Bothnian Bay, however, about 26 % of the coastal waters do not achieve good chemical status, even when disregarding mercury levels.

It is clear that eutrophication is considered a main environmental problem in Swedish water management, and a main reason for poor ecological status according to the WFD – perhaps with the exception of the northernmost part of the country, where the population is small and spread out, and there is less intensive agriculture, which would logically suggest lower amounts of nutrient leads, at least from anthropogenic sources. It is also evident that the risk assessments presented in the management plans paint a discouraging picture with regard to ecological status improvement, as most waters not achieving good water status today are considered at risk of not achieving good status in 2015. This is to some extent connected to the difficulties of short-term improvements with regard to eutrophication.

5.2 The Water Management System

5.2.1 Institutional Structure

The water management system in Sweden is built on the Water Framework Directive (2000/60/EC) (WFD). The directive, and the water management system, was implemented in law in 2004, setting up institutional structure and processes for water management. The water management system is built on a legal basis established in chapter 5 of the Environmental Code (MB), with the title Environmental Quality Norms and Environmental Quality Management. During the six-year water management cycle, the work elements prescribed in the WFD are carried out. The first management cycle concluded in 2009 and the water management system is currently involved in the second management cycle, reaching to 2015. As the work moves forward in these cycles, the methods and data are gradually improved and adapted to the status of the water bodies, and to increased knowledge. The first management cycle focused on developing knowledge about water and the management needed to preserve and improve its quality. The current cycle focuses on deepening the knowledge base and quali-

ty assurance of data for more qualitative and safe classification and risk assessment.[205]

In MB chapter 5, the general framework of institutional organisation and management work is drawn up, and the competences of involved public bodies stated. 1–2 §§ defines environmental quality norms and competence for the Government to establish such norms, and to delegate the power to delegate competence to regulate quality norms implementing EU-law. According to 9 §, the Government can prescribe who should monitor, supervise and control compliance when the quality norms are prescribed. 4–8 §§ prescribes the general duty to establish action programmes where needed to fulfil quality norms, and the competence for the Government to delegate the duty to administrative authorities or municipalities, as well as some regulation on the scope and content of the programme. 10–11 §§, finally, establishes the Swedish water districts and prescribes establishment of water authorities to manage water within these districts.

The more substantive and developed regulation of the water management system is, however, found in lower level legislation, fundamentally through the Water Management Ordinance (2004:660), as amended (2011:634),[206] and then further regulated in the quality norms, etc., on water district level. The Water Management Ordinance prescribes division of the country into water districts, water management authorities and their role (chapter 2), and the different steps and measures to be taken: mapping and analysis in chapter 3, quality norms in chapter 4, management plans in chapter 5, action programmes in chapter 6, monitoring in chapter 7, management in international context, and reporting in chapter 9.

Sweden is, according to MB 5:10 and 2:1 of the Water Management Ordinance, divided into 5 water districts, generally containing many, many river basins, for water management under the administration of the respective "water authorities". These water authorities are tied to county administrative boards in the different water districts, MB 5:11 and 2:2 of the Water Management Ordinance. The actual establishment of water authorities are found in the Ordinance (2007:825) with Instruction to the County Administrative Boards. The water authorities coordinate water management within their own water

[205] For more general information, also in English, on the Swedish water management system, go to: http://www.vattenmyndigheterna.se/Sv/Pages/default.aspx.
[206] Ordinance (2004:660) on the Management of Water Quality and Environmen, as amended (SFS 2011:634). In Swedish: "Förordning om förvaltning av kvaliteten på vattenmiljön" .

district and cooperate with the other water authorities and with the Swedish Agency for Marine and Water Management (SwAM) to ensure that all stakeholders are working towards the same goal in water management. Each water authority has a water delegation comprising experts designated by the Government. The delegation decides on central issues for the entire water district, such as quality norms, action programmes and management plans. Aside from the water authorities, operative authorities realising the management plans. Furthermore, some national agencies, such as SwAM and the Geological Survey of Sweden, are also involve in the management work, and also have some regulatory competence, for example to regulate how monitoring and categorisation, as well as how quality norms shall be calculated (see 3:4 and 4:8–8a of the Water Management Ordinance).

5.2.2 Water Management Procedure According to the WFD

5.2.2.1 **Introduction**

In the following, the Swedish water management procedure will be described. The information is mainly gathered from the water authorities' documentation. The presentation is as far as possible focused on management tied to eutrophication control.

Every water authority shall see to it that description and analysis, and mapping of the effects of human activities on water status are carried out, according to article 5 and annex II of the WFD. They must also make an economic analysis of the use of water, and keep registers over protected areas. This is stated in chapter 3 of the Water Management Ordinance, with reference to the WFD. Further regulation regarding classification of ecological status or potential and chemical status, and environmental quality norms regarding surface water is found in the SwAM Regulation (HVMFS 2013:19) on Classification and Environmental Quality Norms regarding Surface Waters, based in the WFD. To date, SwAM has not issued any general guidance document regulation 2013:19, but EPA guidance on the former EPA regulation (NFS 2008:1) can for the time being probably provide an indication of interpretation and implementation, in practice, of the regulation. The EPA has also published a Handbook on the action pro-

grammes (NFS 2008:6), which provides guidance for the management authorities.[207] Today SwAM is responsible for the handbook.

It should be noted that the Water Management Ordinance also contains rules on international water management, which applies to water districts shared with Norway. The river basin on the border of Sweden and Finland is specifically regulated in the Act (2010:897) on the Border River Agreement between Sweden and Finland. These rules will not be further developed here.

5.2.2.2 Mapping and Classification

In accordance with the WFD, the status of water bodies is identified (see 3:1–2 of the Water Management Ordinance), according to assessment grounds stated in rather detailed instructions and guidance in chapter 2 and annexes of the HVMFS 2013:19, and according to there stated balancing norms. If it is not possible to use the assessment grounds, the Water Authority makes an expert assessment of the water status or potential. Significant uncertainties in the assessment shall also be investigated. The EPA General Guidance here stated examples of such cases where, as a rule, there is risk of such uncertainties, e.g. where the data provides contradictory or some diverging results, where there are little decision-making materials for classification, or where the quality quota for the relevant parameter is very close to a classification limit. The classification process, reasons and results are, according to HVMFS 2013:19 3:15, to be properly documented and presented in the water management data base VISS (Water Information System Sweden).

5.2.2.3 Water Quality Objectives and Standards

Each Water Authority establishes quality objectives for water bodies within their respective district. This is generally published as a regulation for the water district, stating the scope of application of the norms – the water district, definitions, general quality requirements and exceptions, according to legislation and the WFD, and specified quality objectives for each water body in tables in annexes. These regulations with annexes are published on the water authorities web page.[208]

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[207] Naturvårdsverket (after 1 July 2011 Havs- och vattenmyndigheten), Handbok om åtgärdsprogram inom vattenförvaltning enligt förordning (2004:600) om förvaltning av kvaliteten på vattenmiljön, December 2008.

[208] http://www.vattenmyndigheterna.se/En/Pages/default.aspx.

Subsequently, objectives to reach by 2015 are stated in the Water Management Ordinance chapter 4 and chapter 3 of NFS 2008:1, and based on the WFD Art 4. Main objectives are that all waters should reach "good water status" and that water status deterioration, in relation to the originally identified status in each water body, shall be avoided (compare to 4:2 of the Water Management Ordinance, with reference to the WFD). For surface water, this includes both chemical status and ecological status. 4:9–12 of the Ordinance further makes room from exceptions from these objectives, provided, according to 4:13, that such exception does not endanger achievement of quality norms the water district's other water bodies. SwAM regulation HVMFS 2013:19 further regulates, in chapter 3, at what status level the quality objectives shall be set. The chemical surface water status shall, according to 3:4 be "good". In water bodies classified as having "high" or "maximum" ecological status, the quality objective shall, according to 3:2–3, be set at that level. This means that water bodies with a better status should keep it. For water bodies classified as having "good" or lower level of ecological status, the quality objective shall be set at "good". This means that the status must be at least "good". HVMFS 2013:19 further requires, in 3:5, documentation of the quality objectives in the database VISS. In 3:1, para. 2, it is also noted that application of the regulations in chapter 4 of the Water Management Ordinance can entail that the quality objectives shall be set at another level than what follows from 3:2-4 of HVMFS 2013:19. According to fundamental constitutional law, of course, the ordinance is valid before lower level legislation.

The water authorities subsequently develop environmental quality standards to specify the objectives, and action programmes, which are parts of a water management plan for the water district. The quality standards are to some extent based in EU law standards, certainly for chemical water status (see WFD annex IX), but also according to for example the Nitrate Directive, which become relevant in ground waters sensitive to nutrient emissions. The limit quality standard for nitrates in ground waters is set at 50 mg/l. It is possible to prescribe stricter standards if necessary, but this has generally not been necessary for Swedish ground waters.

Standards reflecting ecological surface water status are not specifically set out in this way in EU law, and such standards have, so far, not been prescribed by Swedish water authorities either. In conversation with water authority officials it has been noted that such ecological quality standards are being discussed in the preparations for the

next management cycle, but that, aside from the above noted regulation on nitrates, such standards will in all probability not include standards relating to eutrophication. Nutrient emissions and poor water status due to eutrophication will continue to be handled in the scope of the water quality norms, and the indicators utilised for assessment of the water status.

It should be noted that the ecological quality standards are formulated as "quality objectives" rather than "limit values" (that are stated for chemical quality standards). In Swedish law environmental quality standards are collectively referred to as "norms" rather than standards. This choice of words is considered to allow for quality standards of differentiated legal status. The distinction between "objectives" and "limit values" is important when it comes to individual regulation and enforcement of the norms. The limit value-type standards are of legally binding character and in principle have an absolute authority that can motive more extensive and intrusive regulation in the individual case, than what would normally be regarded as reasonable and proportionate requirements of care under the general rules of consideration in MB chapter 2. "Quality norms", for example ecological quality standards, are however not considered binding. They are normally applied within the frame of general rules of consideration, as not binding materials that is considered in, and may affect, the application of the rules and in balancing of interests in assessment of reasonable due care.[209]

5.2.2.4 **Management Plans**

Each water authority must, according to 5:1 of the Water Management Ordinance set up a management plan. EPA Regulation 2008:18 on management plans for surface water lays down further regulation on the format, content and procedure of the plans. Annex 1 of the Water Management Ordinance states information that the plans must contain.

The management plan shall contain a collective statement of the waters, their status and the management of the water quality on the district. The formulation of the plan shall be adapted to the circumstances of the different river basins in the district. The contents of the plans include mapping of the district's waters, of significant pressures and impacts of human activities, registers on protected areas (including areas vulnerable to nutrients emissions according to the Nitrogen Directive and the Waste Water Directive), maps of the monitoring

[209] Prop. 2009/10:184 p. 48. See also: Judgment of the Land and Environment Court of Appeal on 24 January 2012, in case M 568-11.

network, on action programmes and the measures taken, etc., all listed in Annex 1 of the Water Management Ordinance, in accordance with the WFD, especially Annex VII. According to 5 § NFS 2008:18, the plan shall also present a summary of measures needed to successively achieve good status later than during the current management period, reasons to significant delays and schedule for implementation. According to 6 § NFS 2008:18, the plans should also contain maps according to the specifications of the Annex to the regulation. The Ordinance also prescribes, in 5:2–6, for establishment and accessibility of documents on plans, timetables, programmes for the development of the management plan, and central issues involved. Moreover, publishing and accessibility of these documents and the possibility for the public to submit opinions, is prescribed.

Having analysed the management plans for the Swedish water districts, it seems they contain all the prescribed parts. For example the management plan for Skagerak and Kattegatt[210] contains the following sections, in order:

- *Summary* (providing a general view the water status and the first management cycle),
- *Introduction* to the water management system, the organisation, legal grounds and the work that takes place there, *Description of the water district*,
- *Protected areas according to the Water Management Ordinance* (presenting the relevant areas, including maps and tables and information about the legal grounds for their protection),
- *Monitoring* (describing the monitoring programme, including for example monitoring under EU law),
- *Status 2009* (describing the current status and classification of the district's waters, as basis for the quality objectives),
- *Impact Analysis* (describing how the causes for not achieving good water status, and the results thereof, as basis to effective and realistic action programmes),
- *Environmental Problems* (stating effects and changes that the described pressures and impacts have in the water environment),
- *Economic Analysis* (describing for example cost recovery for water services in 2009),

[210] Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavets vattendistrikt 2009–2015.*

- *Risk Assessment 2015* (describing the efforts to assess the risk of a water body not achieving good water status until 2015, or showing a degrading status),
- *Measures for better water* (summarising the programmes of measures and description of regulation of water),
- Summary of water quality objectives,
- *Participation on water management* (describing how consultation and cooperation with, and information to the public has been carried out, and some comment on the results thereof),
- *Water Management 2009-2015* (looking to the next management cycle and its challenges and prioritised tasks),
- *Materials* listing databases and analysis tools publications and reference documents), and
- Explanation of terms.

The plans are also quite informative about the water management system in general, the history of water management, the development of the water management system, as well as relevant regulation and the aims and purposes thereof, and of the different parts of the plans and the steps of the management cycle. Moreover, the plan also connects the current cycle to earlier management work, and future developments, assessing the level of knowledge and data, the foreseen or necessary developments and measures, and the potential of such developments, etc. The water authorities put the management plans forward as the main instrument for water management.

5.2.2.5 **Action Programmes**

The water authorities shall, according to 6:1 of the Water Management Ordinance, for their respective water district, produce suggestion to and decide on a action programme, stating the measures that have to be taken to fulfil the above described quality norms. The action programmes are developed in accordance with WFD article 11, as a first step in the system for implementing and realising the described objectives and quality standards. They are to be developed in consideration of the knowledge and data gathered in monitoring and classification of the waters. There is some possibility for governmental control of the appropriateness and legality of the action programmes, stated in 6:4 of the Water Management Ordinance. Under certain circumstances, the Government must be given the opportunity to assess a programme suggestion, for example if it concerns a substantial public

interest that is not covered by the aims and scope of the Environmental Code, or if another involved agency has found suggested measures to be in conflict with national or EU water management law, or with other law. According to MB 5:6, action programmes must be reviewed when necessary, and at least every 6 years.

The programmes involve basic and supplementary measures. The general regulation in MB 5:6 prescribes, among other things, that action programmes shall contain information about the quality norms that the programme aims to fulfil, information about what measures, which authorities or municipalities need to take, and when, and also an analysis of the consequences and the financing of the programme. Moreover, information about distribution of demands on different kinds of sources shall be provided. The Water Management Ordinance further prescribes, in 6:5, that a programme shall, among other things, contain measures for establishment of ground water protection, for review of permits or permit conditions, for detecting and enforcing violations against water protection regulation, for preventing and controlling diffuse pollution, for preventing all other negative effects on the water environment. It must also contain the regulations or suggested regulations necessary to realise the suggested measures. According to 6:6 of the Water Management Ordinance, such a consequence analysis shall contain assessment of environmental as well as financial consequences. Finally, the programmes must contain measures and references prescribed in articles 11.3–4 and 11.6 of the WFD.

Meanwhile, county administrative boards and municipalities, and also permit authorities such as land and environment courts and regional licensing boards, etc., are the main operative administrative authorities when it comes to water management. On the regional level, the county administrative boards have the main responsibilities and wide competence in the area of water and environment. They monitor, supervise and enforce environmental law and permit conditions, and they help implement water management regulations.

The measures presented in the action programmes have so far been quite generally formulated, and mainly as guidance to other authorities at different levels of the administration what measures they should take in order to fulfil the objectives and standards. For example, the action programmes focus much on improving knowledge and data as basis of water management. In the management plan for Skagerak and Kattegatt, it is noted that the water management system is fundamentally based on adaptive management, which is a continuous process adapted to new knowledge and flexible to changes in the environment.

Even though the first cycle has provided a lot of such information, more is needed.[211] It is generally stated in the action programmes that central agencies, for example the EPA and the Board of Agriculture "need to" investigate ("produce materials") and "develop regulation and/or other policy instruments" for reducing emissions of nutrients. And Geological Surveys of Sweden should produce maps that point out erosion sensitivity and risks for high phosphorus losses. For the more operative administrative authorities, such as county administrative boards and municipalities, the programme states that they should draw up strategies and plans of different kinds for taking measures in areas that do not achieve good status, and that they should prioritise such areas in their supervision and enforcement.[212]

The few, in legal terms, more specific measures state that the municipalities "need to" demand high level of protection for private sewerages that contribute to a water body not achieving good status, and that the county administrative boards "need to" make a revision of operations with environmental permits, which may have a negative impact on the water environment, and if necessary move to review such permits. The Skagerak and Kattegatt Water Authority also states, in the management plan, that the measures in the programme shall lead to more precise measures by administrative authorities and municipalities, as well as private actors. They argue that it is technically very difficult to reach the environmental objectives in such short time, and that achieving the objectives has been deemed difficult in view of the administrative, legal and practical efforts of measures and cooperation that will necessarily have be taken. The aim is therefore set at a step-by-step approach, starting with building more knowledge and administrative support measures. The data and experience from monitoring and collection of data will support more effective measures further on in future programmes (until 2021 and 2027).[213] Also the management plan for South Baltic holds that the action programme

[211] Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavets vattendistrikt 2009–2015* p. 124.
[212] Vattenmyndigheten Västerhavet, *Åtgärdsprogram. Västerhavets vattendistrikt 2009–2015*, Vattenmyndigheten Södra Östersjön, *Åtgärdsprogram. Södra Östersjön 2009–2015*, Vattenmyndigheten Norra Östersjön, *Åtgärdsprogram. Norra Östersjön 2009–2015*, Vattenmyndigheten Bottenhavet, *Åtgärdsprogram. Bottenhavets vattendistrikt 2009–2015*, and Vattenmyndigheten Bottenviken, *Åtgärdsprogram Bottenvikens vattendistrikt 2009–2015.*
[213] Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavets vattendistrikt 2009–2015* p. 136.

will have to be specified for the separate water bodies in the coming management cycle.[214]

It can be noted that the measures proposed in the different action programmes are very similar, if not identical. This could suggest that the management procedure is still very much at general policy level, and not yet fully implementing and applying the ecosystems approach that is adaptive and flexible – and relevant – to each individual situation. Even though the comparatively less problematic eutrophication situation in the Bothnian Sea and the Bothnian Bay is noted in the management plans and action programmes, the action programmes contain the same measures as the one in the southern water districts where eutrophication is a main problem – and an acute one at that.

It is important to note that the water authorities are not operative. They do not set the programmes in action. It is for other public bodies to initiate, control and enforce the standards and to realise the objectives. It should be noted that these operative authorities are autonomous and independent authorities in relation to the water authorities.

5.2.2.6 **Monitoring and Reporting**

The implementation and realisation of the action programme is then monitored and the results subsequently assessed. The result can lead to adjustments of the plan of the next management cycle, for example further efforts in the action programme or adjusted quality standards. The idea of this adaptive management system is to be able to adjust the management norms, strategies and measures over time, due to failure of former measures or changed water status. For example, where monitoring or other data indicate that the objectives of the WFD are unlikely to be achieved, the action programme should, according to art. 11.5 of the WFD, involve investigation of the causes for that, examination and review of relevant permits, etc., and so on.

According to the Water Management Ordinance, the water authorities establish monitoring programmes in cooperation with concerned authorities and other stakeholders. Sweden has long had well-developed water monitoring systems, but through these monitoring programmes, the idea is to achieve a complete and coordinated overview of the water status, and to be able to follow up taken measures and status developments. The thus established monitoring programmes involve both general monitoring to provide a full description

[214] Vattenmyndigheten Södra Östersjön, *Förvaltningsplan. Södra Östersjöns vattendistrikt 2009–2015* p. 128.

and representative view of the water status in the district, and more operative monitoring in water bodies what risk not achieving set quality objectives and to follow up the effects of the action programmes. There is also monitoring of ground water quantities, investigation in case of pollution incidents, etc., and special monitoring in protected areas. For this purpose, the water district has many monitoring stations established, and data from the monitoring at these stations is documented and used in the management work. The information obtained in these programmes is used for national reporting to the EU. The management plans indicate that some efforts to adjust existent monitoring systems to the monitoring programs within the water management system are still needed.[215]

SwAM shall fulfil duties of reporting to the EU Commission under the WFD. Water Authorities shall submit their management plans, action programmes and other information that the Agency needs for such reporting. (See Water Management Ordinance chapter 9.)

5.2.3 Regulatory Measures in Water Management

Water management law, in the way it is understood today, is a rather new area of Swedish law. Exploitation of water in relation to other right holders, etc., and physical changes to water have been an important part of traditional law on real property, etc. Water pollution has also been regulated. However, comprehensive management of water from a more qualitative and ecological perspective has largely been introduced through implementation of the WFD. As can be drawn from this presentation of the management system, the framework for the management system is drawn up in a regulatory framework. The water authorities, their aims and tasks, etc., are prescribed in law, and the water authorities in turn state the quality objectives for all the thus managed water bodies in legislation – through regulation by the county administrative boards.

However, the substantive qualitative objectives are rather general legal norms. They state an objective of, for example, "good ecological status" or "high chemical status". The assessment of whether these normative objectives are achieved will largely rest on expert analysis

[215] See for examples: Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavet 2009–2015* pp. 52ff., and Vattenmyndigheten Södra Östersjön, *Förvaltningsplan. Södra Östersjöns vattendistrikt 2009–2015* pp. 47ff., and Vattenmyndigheten Norra Östersjön, *Förvaltningsplan. Norra Östersjöns vattendistrikt 2009 – 2015* pp. 49 ff.

based on the many quality indicators that have been stated in the WFD and further in the annexes of the Water Management Ordinance, etc.[216] This assessment will to a large extent have to be carried out by experts in the natural sciences – not mainly for lawyers and judicial decision making bodies. On one hand, this indicates that the system is relevantly tied to the actual ecological, and other natural scientific, circumstances. On the other hand, it suggests some detachment from legal expertise, which may disconnect actual regulatory decision-making and other policy instruments from the natural scientific context. This could indicate that regulatory measures and juridical decision-making should have a limited role to play in the water management system. Or at least that it should play a limited role, as the lawyer can hardly make an independent and relevant assessment of the appropriateness of her decision – he has to rely on the natural scientific experts involved. On one hand there is a risk that the regulatory measures are not appropriately base din natural sciences. On the other hand, the regulatory procedure risks losing transparency and controllability when the normative assessment is in reality not made by the legal decision-maker.

There is some room for specification of the quality norms, through legal standards expressed as limit values, etc. Such specified limit values makes regulatory control and steering more transparent, when it is more possible for the regulator to make an independent normative assessment. However, as explained above limit values are to date mainly in place for some prioritised chemicals regulated in EU-law. Ecological standards are not in place yet in the Swedish management system, even though there are plans for prescribing such standards in the coming management cycles. In the context of managing the eutrophication problem, however, such standards are not planned. One exception is nitrates pollution, for which some such limit values are in place already the EU Nitrates Directive. However, nitrates pollution is not a very big problem in Sweden, and it is certainly not considered a central concern in the context of eutrophication control in this country. Phosphorus and nitrogen emissions, especially from agriculture and from sewerage are main concerns in this context, and they are managed in the scope of the general quality objectives, and assessed with help of the quality indicators. This means that more specific regulatory control in an individual case or for an individual water body is chal-

[216] See for example: Vattenmyndigheten Norra Östersjön, *Förvaltningsplan. Norra Östersjöns vattendistrikt 2009 – 2015* pp. 70.

lenging. Such regulation needs clear limit norms the achievement of which is easy to control, and where breaches of law can be clearly identified and proved.

When it comes to the management plans and action programmes, however, it is clear that regulatory measures are central and that further developments are wanted. The management plans for 2009–2015, point to the regulation of, for example, point sources through permit procedure and protecting valuable areas through nature conservation law, etc.[217] Moreover, the action programme document for the same period departs from referring the history and development of regulatory measures already taken to control eutrophication, nationally and on EU level, and some note results. It is clear that these measures have had a central role. Furthermore, the programmes suggest further regulatory measures in the current management cycle, including that central agencies need to make investigations into and develop new regulatory measures to control eutrophication, for example EPA regulation to mitigate nutrients emissions from wastewater treatment plants, and the Board of Agriculture to regulate the impact of agriculture on water quality. The programme also directs the operative authorities to start reviewing permits and regulating individual sewerage operators, etc., in order to ensure necessary implementation and enforcement of already existent legal norms with regard to water quality, appropriate technology and methods, etc., to control and delimit nutrient emissions.[218] The programme of measures for Skagerak and Kattegatt states an assessment that the stated policy instruments will not suffice in reaching the necessary emission reductions, at least not until 2015.[219] At the same time, the management plan notes that it will be challenging to achieve the set quality objectives, certainly with regard to eutrophication of coastal waters. It is noted that it takes a long time for measures to be reflected in improved water quality, but also that the

[217] Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavets vattendistrikt 2009–2015* p. 140 ff., Vattenmyndigheten Södra Östersjön, *Förvaltningsplan. Södra Östersjöns vattendistrikt 2009–2015* p. 141 f., Vattenmyndigheten Norra Östersjön, *Förvaltningsplan. Norra Östersjöns vattendistrikt 2009 – 2015* pp. 135 ff.

[218] Vattenmyndigheten Västerhavet. *Åtgärdsprogram. Västerhavets vattendistrikt 2009–2015* pp. 18 ff., and summary at p. 8 ff., Vattenmyndigheten Södra Östersjön, *Åtgärdsprogram Södra Östersjöns vattendistrikt 2009 – 2015* p. 22 ff., and summary at p. 10 ff.

[219] Vattenmyndigheten Västerhavet. *Åtgärdsprogram. Västerhavets vattendistrikt 2009–2015* pp. 18 ff. p. 80.

necessary administrative and legal changes will take a long time.[220] Other reports have also shown that the challenges that management through regulation face are perceived as enormous. Central agencies are looking for alternative policy instruments to manage the eutrophication problem, for example in the EPA investigation into emission certificates and a trading scheme for controlling nutrients emissions from wastewater treatment plants (see above under 3.2.3.7).[221] The Skagerak and Kattegatt action programme also notes the necessity of such policy instruments and refers to the EPA investigation.[222]

An important thing to note is that the action programmes, even though stated as legally "binding",[223] do not have very much normative authority. The programmes are not developed and/or decided by the operative authorities. The water authorities do not carry out the actual regulation – or any other measures – neither general regulation in legislation, nor operative regulation through licensing, review or enforcement in the individual case. The water authorities has a more strategic and knowledge building role. This means that they do not decide themselves what measures are going to be made. This is an independent decision for the topical authority. These authorities are not subordinated to the water authorities in any way. This, of course, means that administrative control of the realisation of the measures, which the water authorities have considered necessary and appropriate, is very weak. There are some more general control functions within the Swedish constitutional system, for example central and municipal audit authorities, etc., but there is little authoritative administrative control within the water management organisation as such.

[220] Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavets vattendistrikt 2009–2015* p. 125 and p. 150, Vattenmyndigheten Södra Östersjön, *Förvaltningsplan. Södra Östersjöns vattendistrikt 2009–2015* p. 150.
[221] EPA, Rapport 6521, *Styrmedel för ökad rening vid kommunala reningsverk.*
[222] Vattenmyndigheten Västerhavet. *Åtgärdsprogram. Västerhavets vattendistrikt 2009–2015* pp. 18 ff. p. 80.
[223] See for example: Vattenmyndigheten Södra Östersjön, *Förvaltningsplan. Södra Östersjöns vattendistrikt 2009–2015* p. 12.

5.3 Ecosystems Approach and Water Management

5.3.1 Introduction

As noted in the beginning of this chapter, the water management system, which is based in in WFD, fundamentally reflects an ecosystems approach. The management system works with environmental standards based in information and knowledge about physical, ecological and chemical circumstances. The management procedure involves stakeholders and the idea is that management is continuously adapted to the specific water characteristics, and to changed circumstances. In the following, this ecosystems approach will be further developed and reflected on, with basis in the chosen characteristics of use of ecological standards, adaptiveness, responsiveness, and stakeholder participation in the water management system.

5.3.2 Ecological standards in water management and regulation

As has been shown, the water management system is built on the setting of relevant water quality standards. The water authorities establish quality objectives for each water body, based in collected knowledge and data with regard to the different waters, and norms set out in the WFD and subsequent national legislation. The overarching objective is that all waters should reach "good water status" and that the status should not deteriorate. For surface water this includes ecological as well as chemical status, but there are exceptions, and these exceptions also depend on relevant circumstances for the specific water body. Water quality indicators, for example of eutrophication, are used to support assessment and management of the water status. The water authorities subsequently establish action programmes, which are parts of a water management plan for the water district, and which lay out the plan for how to work towards the thus set objectives.

The water authorities may further develop environmental quality standards to specify the objectives. To date, regulation through legal quality standards are not developed when it comes to ecological status. Quality standards for chemical water status are to some extent based in EU law standards, but similar ecological standards, are not specifically set out in EU law, and have not to date been prescribed in the Swedish management system. Ecological quality standards are being discussed in the water authorities' preparations for the next management cycle, but not in relation to eutrophication. Nutrient

emissions and poor water status due to eutrophication will therefore continue to be assessed and managed in the scope of the water quality objectives, with the help of water status indicators. This means that ecological water quality standards are fundamentally reflected in regulation, and that regulatory measures should reflect such standards. However, the hard legal norms are very generally formulated as quality objectives, prescribing an objective of "good status", etc. The status indicators are valuable tools for assessment, monitoring, etc., but they do not have any direct legal authority. The water management system shows little use of clear "limit values", which are considered legally binding, and the breach of which can be directly observed, regulated and enforced, at least when it comes to ecological status and most topically for eutrophication. Quality objectives or "quality norms" as expressed in the Swedish legal order, are not considered binding, but normally applied within general rules as material information that must be considered and may affect the application of rules and the balancing of interests in the context of regulation.

The water management system will therefore gather a lot of data and knowledge, and set the aims and objectives of management, and then monitor and assess the results, etc. Operative regulation is, however, carried out by the administrative supervision and enforcement authorities and instruments, mainly municipal and county administrative boards, through the same regulatory instruments as before. The ecological objectives established by the water authorities should serve as decision making information and be considered in the balancing of interest in regulation through administrative orders, licensing, etc. The link to ecological standards in regulation is nevertheless weak. The water management system provides no direct normative authority to the ecological standards. Such water quality standard is not directly reflected in regulation, but rather left to the indirect influence through enriched decision-making materials, etc. This non-normative and general formulation of quality status objectives makes enforcement and sanctions of different kinds almost impossible to impose. Basic rules under the principle of rule of law (or the Rechtstaat) requires that there be a clear and binding legal standard, the breach of which can clearly be observed in order to invoke sanctions or other kinds of enforcement measures. The citizen should be able to foresee how he or she should act and how to avoid breaching the law.

The ecological objectives and standards developed in the water management system must be made "operational" so that they may be better reflected in regulation. This means that we need to translate the

objectives into binding substantive norms, and regulate clearly what measures need to be taken and what must be avoided in order to reach the objective. There needs to be a link to more classical regulation, which is more or less the same as before. The action programmes to some extent has that function. The Swedish action programmes are, however, not drawn up by the operative regulatory authorities, and they do not directly and in a very authoritative manner direct regulation. As discussed earlier, the action programmes are more formulated as policy guidance to the operative authorities, prescribing general measures. A sign of the more general policy role of the action programmes, and the poor link between measures and the ecological status and objectives, is that the measures prescribed in the action programmes in the different districts and all their water bodies are very similar, if not identical.

5.3.3 Adaptiveness

The water management system is fundamentally based in adaptive management, setting up a complex system of categorising, assessing, and monitoring system, and establishing specific quality status objectives for each water body, based on its specific characteristics, status and other circumstances. However, as noted above, this has not necessarily resulted in adaptive management through regulatory measures. Adaptiveness in regulatory management would indicate relevant regulatory differentiation in individual situations in different water bodies. On the more general normative level, the above described quality objectives are individually set and described. However, the action programmes do not reflect adaptiveness in the measures to any further level of specification. This is left to the operative authorities in their regulation through their existent instruments and regulations, for example those described in chapters 3 and 4 considering regulation of sewage water and agriculture. Here we can find differentiation in regulation that is related to the ecological status and risks of the relevant water environment, etc. The action programmes do direct operative authorities to, for example, draw up strategies for prioritisation in their regulatory work to areas that do not reach good water status. However, also in this respect is the link between the ecological status and the adaptive regulatory management quite weak, and to a large extent left to the administrative discretion of operative authorities. Their regulation is not directly tied to the water management cycle.

5.3.4 Involving different stakeholders

Stakeholder participation is well established and recognized as a fundamental part of the water management system under WFD. The EU has published a guidance document on public participation,[224] describing different levels of participation, with successive degree of commitment: basic information to the general public, consultations carried out at set points in time during the management process and addressing the general public, and promotion of cooperation with different involved stakeholders as early as possible in the management procedure. The Swedish Water Management Ordinance states, in 2:4, that the water authorities shall plan their work so that it facilitates and encourages participation from all stakeholders in the management process. Before a water authority decides on quality objectives, management plans, programmes of measures, and other matters of significance, it must consult with concerned authorities, municipalities, organisations, operators and individuals.

The water authorities also refer to participation at the local level as a cornerstone of Swedish water management.[225] As many stakeholders as possible are to be involved to discuss local problems and receive contributions on their solutions at an early stage so that they can actually be part of the development and implementation of the management plans and measures. Information within the management system is also generally public and quite easily accessible for the public. Participation and dialogue also take place continuously in water boards, which provide regional and local forums where concerned stakeholder can discuss common water issues. The water authorities and county administrative boards in each water district work to form a water board for each drainage area. The idea is that these boards can become the natural forum for cooperation within the area. In June 2013, there were over 125 water boards in Sweden. They are required to be organised so as to reflect local conditions and the character of the water district, and to provide everyone affected by the water in the drainage area to participate, and be prepared to participate in cooperation. They should also have a holistic view of inland, coastal and ground water and understand the water flow to the sea, and with focus on the drainage area instead of administrative boundaries.

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[224] *Public Participation in relation to the Water Framework Directive*, EC Guidance Document 8.

[225] See for example on the official website of the water authorities: http://www.vattenmyndigheterna.se/En/Pages/participation-and-dialogue.aspx.

Looking at current management plans, it is clear that the participation process is very similar, and so are the results and the experiences of the process. Basically, it is clear that information to the public is good, and that a good basic structure for participation has been developed. Actual results from the input from participating stakeholders seem bleaker, and are generally limited to readability of the documents, and access to information.[226] General information is well provided for. Aside from the general constitutional right to access to public documents (TF chapter 2), there are also valuable web services. Water Authorities publish all their decisions and plans, etc. on their web site, and together with the county administrative authorities, they have developed an information system called VISS – Water Information System Sweden, providing overview information of water bodies, their status classification, environmental quality norms, monitoring, etc. VISS comprises three parts: a database where all information of the water bodies are stored, a map with geographical overview of the database information, and a help-part with explanations of terms and concepts, etc. Moreover, the water authorities also publish newsletters that they send to authorities, municipalities, and all other interested entities, as well as making them accessible online. They also contribute to articles in media, produce and spread posters and pamphlets, and more. These measures are described in the different management plants, and the information is often available on the water authority web site.[227]

Consultations take place at different set times of the management procedure, for example, for the Skagerak and Kattegatt water district in the last cycle, and under the following titles:[228]

- Working programme – cooperation for better water (1 February–August 2007)
- Overview of significant questions for the management plan (1 February–1 August 2008)

[226] See, for examples: Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavets vattendistrikt 2009–2015* p. 158 ff., Vattenmyndigheten Södra Östersjön, *Förvaltningsplan. Södra Östersjöns vattendistrikt 2009–2015* p. 162 ff, esp. p. 172, and Vattenmyndigheten Norra Östersjön, *Förvaltningsplan. Norra Östersjöns vattendistrikt 2009 – 2015* pp. 151 ff, esp. p. 161, and Vattenmyndigheten Bottenhavet, *Förvaltningsplan. Bottenhavets vattendistrikt 2009–2015* pp. 171 ff, esp. p. 181.

[227] See, for examples: Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavets vattendistrikt 2009–2015* p. 158 f.

[228] Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavets vattendistrikt 2009–2015* p. 160 ff.

- Management plan proposal (1 March–1 September 2009)
- Action programme proposal (1 March–1 September 2009)
- Quality objectives proposal (1 March–1 September 2009)
- Environmental impact assessment proposal (1 March–1 September 2009)

Contributions of participating stakeholders were documented and communicated, and processed in the water authorities. In the management plan for the Skagerak and Kattegatt water district some adjustments of different documents were made after consultations, but mainly for clarification, coordination and readability. Other views were noted as incorporated in the Water Authority's "daily work".[229]

Cooperation with involved stakeholders mainly takes place through different kinds of meetings for exchanging information and experiences, to learn from each other and to spread information. Cooperation bodies or groups are established for this purpose. These meeting take place at all levels – international, national, regionally and locally.[230]

5.3.5 Legal measures in response to poor ecological status

The water management system as such does not comprise any measures or instruments to respond directly to a detected breach of ecological standard, or poor ecological status. As described above, the water authorities continuously monitor and assess the water status of their respective waters. When it is found that the ecological status of a water body does not live up to the prescribed objectives, or when a quality standard is not fulfilled, the situation is analysed and reported in the water district's management plan. The management plans will thus refer assessment of causes, risks and potential for improvement, etc. Furthermore, the action programme should then suggest measures to address the problem. However, as noted repeatedly in the above, the action programmes are still quite generally formulated, and they do not address specific problem or authoritatively direct operative regulation, etc. Instead, the observations made in the management cycle and the plan will serve as materials that the operative authority may use as basis for their regulatory response to poor status.

[229] Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavets vattendistrikt 2009–2015* p. 160 ff.
[230] See, for examples: Vattenmyndigheten Västerhavet, *Förvaltningsplan. Västerhavets vattendistrikt 2009–2015* p. 164 ff.

The action programmes do direct, in more general terms, that, for example, county administrative boards should investigate the need for initiating permit review in view of risks to water quality – based on the information water management plans, it should be understood. Moreover, it is stated that the municipalities need to demand high level of protection for private sewerages that contribute to a water body not reaching good status. To some extent the management plants hold that it is difficult to reach the set objectives short term, and instead they opt for a step-by-step approach, starting with building more knowledge and administrative support measures and then later no develop more effective measures in future programmes. The water management system is thus responsive to noted problems with water status, but it does not comprise direct regulatory response, and also points to the difficulties of such short-term response.

It should however, be remembered that the permit review and other regulatory response instruments, some of which have been described in chapters 3 and 4, and can be further read about there, are relevant also in the context of water management, and can be used in response to poor water status noted in the programmes. Again, the main point here is that the link between the management system and the regulatory measures is weak. It is, however, indicated in some programmes that it is under development.

5.4 Concluding and Summarising Remarks

It can be concluded that the water management system comprises a comprehensive ecosystems based management of inland and coastal waters. The implementation of the WFD has contributed to development of ecosystems approach in such water management. The system is very relevant for management of nutrients pollution into marine waters and the eutrophication problem, as such a large extent of the nutrient loads to the sea comes from water pollution, and mostly from land based sources. Sometimes the benefits with regard to marine waters are also indicated in passing in the management documentation.

The water management system has been thoroughly implemented in the Swedish institutional system, with the establishment of new water authorities and the introduction of a comprehensive cyclic management procedure and a whole regulatory and structure. The actual management procedure and results, nevertheless, is still establishing. The first two management cycles have focused largely on the collec-

tion and management of knowledge and date. The management plans and action programmes still reflect the need for more knowledge and information, and not as much focus on more concrete management of the waters and taking management measures, including regulatory measures. The action programmes are indeed generally formulated and manifest more a policy guidance effort than concrete direction of planned measures for each water body based on therefore relevant objectives, standards and information. Moreover, the action programmes are basically identical for all the Swedish water districts. The programmes reflect some discussion on the management challenges, and the problems of short-term management results. It is clear that the water authorities expect the water management system to develop over time It may also indicate that the system, at least today, fails to reflect required flexibility and responsiveness potential. It can also be noted that stakeholder participation seems, according to the documentation from the water authorities, to cover mainly information meetings and efforts of clarification of documentation, etc. There is little evidence of active participation the actual management efforts.

Aside from the above noted challenges, it can also be noted that no legal standards reflecting ecological status or any clearly legally binding quality norms with relevance to nutrient concentration or indicators of nutrients have been established within the water management system – even though the management plans state eutrophication as a main challenge and reason for not achieving water status objectives. It can be noted that management of nutrients pollution and eutrophication within this system does not display a focus clear and specific regulatory management measures. Either the system fails to formulate clear and appropriate such regulatory management, or there is a choice to avoid such steering. Reasons for that will include political acceptance but also considerations of effectiveness, etc., and will not be further developed in the context of this report.

In summary, the presentation has shown that the water management system indeed reflects an ecosystems-based approach to water management that is very relevant also for management of marine environment and eutrophication. The presentation has, however, also shown that the direct link from relevant knowledge and status of the water on to actual management action, including regulatory management, is still weak. The system is still very much focused on assessment instead of management. An effective management order will need more knowledge and time to establish, but also clear and concrete efforts for a more operational management structure.

It should be noted, in this context, that management of marine waters is not directly included in the water management order, other than for coastal waters. The positive spill-over effects on marine environment are to a great extent implicitly understood. The establishment of a marine environment management system under the MSD should help strengthen this link.

6 Closing Remarks and Summarising Observations

6.1 Eutrophication and Policy in Sweden

The threat against the marine environment, topically Baltic Sea environment and eutrophication, has long been recognised as an important and acute challenge. Marine environment is also well established on the political agenda of the Swedish government, especially following recent year developments within HELCOM and the EU.[231] There is extensive understanding and acceptance for the need for strong policy and measures to abate eutrophication in the Baltic Sea. It has nevertheless proven challenging to achieve appropriate management and regulation.

Sweden is one of the main contributors of nutrient pollution to the Baltic Sea, with about 19 % of the nitrogen load, and 13 % of the phosphorous load.[232] The main sources are agriculture, industry and municipal wastewater treatment plants. A wide range of measures have been taken to reduce the output, which has led to some, but far too little reduction in the anthropogenic loads. It is argued that fulfilment of the BSAP reduction targets is far away.[233]

Marine environment and eutrophication is central in Swedish environmental policy and law, and the objective Zero Eutrophication is stated as one of the central environmental objectives, which serve as basis for environmental law and policy in Sweden. The Swedish government has established what has been called a "new generation of marine policy", aiming for sustainable use of the resources of the sea and coastal areas, ecosystem preservation and restoration, as well as

[231] See for example in financial government bills: Prop. 2006/07:100 and Prop. 2007/08:1.
[232] HELCOM, PLC-5, pp. 9 and 15. See also: Extended Summary of the Main results of the Fifth Pollution Load Compilation, draft (7 May 2010), HELCOM Ministerial Declaration on the implementation of the HELCOM Baltic Sea Action Plan, 20 May 2010, Moscow, p. 2.
[233] EPA, Rapport 6500, *Steg på vägen. Fördjupad utvärdering 2012*, June 2012, pp. 299ff; EPA, Rapport 6433; *Miljömålen på ny grund. Naturvårdsverkets utökade årliga redovisning av miljökvalitetsmålen 2011. Reviderad version av rapport 6420*.

development and growth of business related to the sea. A comprehensive, integrated and multi-sectorial approach, international cooperation and strong political leadership are emphasised.[234] The government has argued an ecosystems approach to management,[235] and pushed for increased stakeholder participation on all levels of governance.[236] They have also suggested a range of more substantive policy measures. The EU marine policy is held as point of departure, and coordination between EU marine policy and HELCOM is emphasised.[237] The government nevertheless emphasises the need for action on the national level, taking the necessary measures to implement the relevant international agreements.[238] Coordination of implementation and management under the MSD, the BSAP and the WFD is held necessary for effective management.[239]

6.2 Regulatory Measures to Manage Nutrients Pollution and Eutrophication

Swedish environmental law is based in the Environmental Code system, comprising a comprehensive code and a very substantial amount of subsidiary legislation and government recommendations. The whole system is to be interpreted and applied under the general rules of consideration, comprising, for example, a general duty of care, BAT, a best location principle, etc. The operative administrative authorities will also apply these principles directly in their regulatory work. Most of the international law, including EU-law, investigated for this study, is implemented through the Environmental Code system, especially in lower level legislation and through administrative recommendation documents. For example regulation of sewerage and wastewater treatment, implementing the EU Waste water directive as well as the Helsinki Convention and HELCOM recommendations, is regulated as environmental hazardous activities, and to some extent as a public health matter in chapter 9 of the Environmental Code, subse-

[234] Ibid. pp. 12ff. Prop. 2008/09:170 pp. 12ff; Skr. 2009/10:213 pp. 12ff., and 23ff. The integrated approach also echoes the EU strategy for the Baltic Sea Region stated in COM(2009) 248, the implementation of which was reported by the Swedish government in Skr. 2009/10:159.
[235] Prop. 2008/09:170 pp. 37 ff. Swedish marine planning is further developed in chapter 5.
[236] Prop. 2008/09:170 pp. 49ff.
[237] Ibid.Prop. 2008/09:170 e.g. pp. 31. See also: Skr. 2009/10:213 pp. 15ff.
[238] Skr. 2009/10:213 pp. 14f.
[239] Skr. 2009/10:213 pp. 14ff.

quent ordinance, and most specifically through EPA regulations. Regulation of agriculture, implementing Helsinki Convention provisions and HELCOM recommendations, as well as the EU Nitrate Directive, through chapter 12 of the Environmental Code, and Ordinance (1998:915) on Environmental Care in Agriculture and subsequent regulations, especially from the Board of Agriculture. An important regulatory instrument and procedure is the permit and permit conditions. To a large extent, Swedish environmental law, also in the here topical matters, is focused on specific and individual regulation of substantive standards of care – emission limits, technical standards, etc. – are regulated via principles and general rules of care and balancing of interests, etc., to be specified in the individual case, for the individual activity and in its relevant environment, through permit decisions or regulatory orders or other individual administrative decisions.

6.3 Ecosystems Management, Marine Environment and Eutrophication

Swedish environmental law does, since 2004, set up a comprehensive water management system that builds on the WFD and chapter 5 of the Environmental Code, and which essentially reflects an ecosystems approach to water management. In the water management system, eutrophication is held as a major concern. In 4 out of 5 water districts, there are serious eutrophication problems, and significant parts of the management plans and action programmes are aimed at improved control of nutrients pollution. There is, however, not much hope of significant improvements of, at least in the near future.

The first water management cycles in the described system have been focused on gathering data and improving and deepening knowledge necessary for relevant management based in the actual status and functions of the ecosystems. This knowledge will then serve as basis for management, including taking regulatory management measures. However, the operative management is to a great extent displaced from the water authorities' strategic management work. The concrete regulatory measures are presented as central management measures, but they are exercised by separate and independent administrative bodies using the same regulatory instruments as before. Their regulation is only quite generally instructed and guided by the management plans and action programmes of the water management system. From regulatory management perspective, the link between

strategic and comprehensive water management with ecosystems approach, to concrete and operative regulatory management measures, is quite weak.

The link to marine environment is also quite weak in the management order. The water management system covers coastal waters, and is crucial in managing marine pollution from land-based sources, directly of through watercourses. Indirectly, the water management system is crucial when it comes to managing marine environment, certainly with regard to eutrophication. However, consideration of marine environment apart from coastal waters is rarely openly discussed.

Implementation of the Marine Strategy Directive is to establish a system for marine environmental management, aiming at good environmental status in the Baltic Sea and the Swedish waters in Kattegatt. The regulatory framework for this system has been drawn up, and a new central Agency for Marine and Water Management has been established. In the initial assessment work, it has been clearly stated that the marine environmental status is not fulfilling the said objective, and that eutrophication is a main reason for these problems. The actual marine environment management procedure has yet to receive wider and more concrete application and effect, at least when it comes to regulation of nutrients pollution. To some extent the system overlaps with the water management system of WFD, and they should ideally be coordinated. Such coordination has not been clearly visibly in this investigation.

6.4 Closing Words

This investigation has shown example of extensive Swedish regulation of nutrients pollution from sewerage and agriculture, but at the same time reports of little improvement of the eutrophication problems of the Baltic Sea region. The water and marine environment management systems are aimed at taking a comprehensive and holistic view at managing water environment through an ecosystems approach – adaptive and flexible management, including regulatory management, based on relevant knowledge and information on the status and functions of the relevant ecosystems, and with involvement of a wide range of stakeholders. It has been shown that the institutional structure of such systematic and ecosystems based management has been established, and that the knowledge base is being built up, but that its realisation in concrete management work is still uncertain. Even though

the management system objectives, norms, plans and programmes comprise a good basis for operative regulation and other concrete management measures, their actual application and realisation is not very clearly and specifically directed or controlled. The linking between marine environment and concrete management measures is even weaker. Ecosystems management of marine environment, specifically with the aim of abating eutrophication, is therefore quite established on a strategic level, but its realisation in actual regulatory management work is still not clearly established in the Swedish environmental management systems.

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