

Scientific analysis on the designation of Natura 2000 sites and the status of nature and effort

A comparison of The Netherlands, Schleswig-Holstein and Denmark

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1 Introduction

This project is initiated by the Environmental Protection Agency with the purpose to evaluate and compare three countries, Denmark, the Netherlands and Schleswig-Holstein/Germany, with regard to their implementation of the Habitat Directive and with special focus on ammonia sensitive natural areas and habitats in general. The three selected countries are the choice of the Agency and other potential candidates are not considered.

The project includes three separate analysis, a scientific as well as a legal and an economic analysis. Each country has made their own scientific, legal and economic analysis. In Denmark, the legal and economic analysis is performed by IFRO, Copenhagen University, and the scientific analysis is performed by DCE – Danish Centre for Environment and Energy, Aarhus University. Project leader Brian Jacobsen, IFRO.

This report is an aggregated scientific report based on the three individual country reports. The structure in the aggregated report is closely linked to the original questions posed to each country and divided in two overall sections representing the implementation of the Habitat directive and the status and measures taken on the ammonia sensitive areas.

The overall findings of the scientific analysis is that the three countries are very similar with regard to size, agricultural structure and amount of nature areas. There are also many resemblances on the implementation of the Habitat Directive and the designation of Natura 2000 areas. However, there are differences in the concept of ammonia sensitive areas, the classification systems used and how critical loads are integrated in the regulation and measures of the Natura 2000 management plans.

More details can be found in the three individual country reports.

2 The designation of Natura 2000 sites

a) Number of SAC's (land and sea) and the variation in sizes and number of habitat types in the sites

The number of sites designated in the three countries are shown in Table 1. There are fewer sites in The Netherlands compared to Denmark and Schleswig-Holstein, but the average size of the Dutch sites are twice as big as the Danish sites, which are again much larger than the many small sites in Schleswig-Holstein.

Table 1. Special Areas of Conservation in the three countries

Country	No of SAC's	Average size in ha	Variation in no. of Habitat types
The Netherlands	138	11,052 ha	0-9
Schleswig-Holstein	271	1,377 ha	1-10
Denmark	261	6,080 ha	1-39

b) The total habitat area distributed in biogeographical regions

There are two terrestrial biogeographical regions in Denmark and Schleswig-Holstein: the Atlantic and the Continental region. All terrestrial area in The Netherlands are in the Atlantic region.

Table 2. Biogeographical regions in the three countries

Country	Atl	Con
The Netherlands	100 %	0 %
Schleswig-Holstein	50 %	50 %
Denmark	36 %	64 %

c) The percentage of land area covered by Natura 2000 sites

Natura 2000 sites are designated either as Special Areas of Conservation (SAC) under the Habitat Directive or Special Protection Areas (SPA) under the Bird Protection Directive, or both. In all three countries, the total area of Natura 2000 sites is around 10 percent.

Table 3. Natura 2000 sites in the three countries

Country	N2000 land area	N2000 Percentage
The Netherlands	3455 km ²	10 %
Schleswig-Holstein	1560 km ²	9.9 %
Denmark	3640 km ²	8.5 %

d) The percentage of the land area covered by SAC's

In all three countries, the land area of the SAC's is 7-8 percent of the total land area.

Table 4. SAC percentage in the three countries

Country	SAC land area	SAC Percentage
The Netherlands	2890 km ²	8.2 %
Schleswig-Holstein	1136 km ²	7.2 %
Denmark	3219 km ²	7.5 %

e) The percentage of the land area covered by Special protection areas (SPA)

In Schleswig-Holstein and Denmark, the land area of the SPA's is 6-7 % whereas the Dutch area is a little higher, 7.5 percent.

Table 5. SPA percentage in the three countries

Country	SPA land area	SPA Percentage
The Netherlands	2640 km ²	7.5 %
Schleswig-Holstein	1050 km ²	6.7 %
Denmark	2642 km ²	6.1 %

f) The percentage of land area covered by natural, non-cultivated areas

Overall, the distribution of the land cover classes in the three countries are similar. The largest part of the total land area is occupied by agricultural land (60-70 %). The build up area in The Netherlands is almost the double as in Schleswig-Holstein and Denmark and the area with open nature is 8-9 percent in Denmark and The Netherlands, but very small in Schleswig-Holstein. This is probably due to the calculation methods where grassland and grassed natural areas in Schleswig-Holstein is part of the agricultural land cover class.

Table 6. Percentages of land cover classes.

Land cover class	The Netherlands	Schleswig-Holstein	Denmark
Agricultural area	60 %	70 %	61 %
Forest	10 %	11 %	13 %
Lakes	5 %	5 %	2 %
Built up area	14 %	8 %	7 %
Infrastructure	2 %	4 %	6 %
Nature	8 %	1 %	9 %
Other	1 %	1 %	2 %

g) Annex I habitats and Annex II species present on the designated sites

There is only little difference in the number of habitat types present in the three countries. There are no stony banks or sea cliffs in The Netherlands, and no raised bogs in Schleswig-Holstein, but apart from that, it is more or less the same habitat types in the three countries. The marine habitat types are excluded in this overview. The number of sites where these habitat types are present reflects the designation process, with fewer, but larger sites in the Netherlands and a large number of small sites in Denmark and Schleswig-Holstein.

Table 7. Annex I habitats in the designated SAC's

Country	Habitat group	No of habitat types	No of SAC's
The Netherlands	Coastal and dunes	14	52
	Forest	8	71
	Heathland	9	53
	Meadows, mires and fens	5	79
	Grassland and rocks	3	46
	Freshwater	8	81
Schleswig-Holstein	Coastal and dunes	18	57
	Forest	10	202
	Heathland	10	140
	Meadows, mires and fens	4	46
	Grassland and rocks	3	51
	Freshwater	7	132
Denmark	Coastal and dunes	18	128
	Forest	10	159
	Heathland	8	106
	Meadows, mires and fens	6	183
	Grassland and rocks	3	164
	Freshwater	8	198

There are small differences in the species present in the three countries, but overall the same number of species. Again, fewer but larger sites are designated for the Dutch species and a larger number of small sites for the Danish and German species.

Table 8. Annex II species in the designated sites

Country	Species group	No of species	No of SAC's
The Netherlands	Amphibians	2	34
	Fish	10	51
	Invertebrates	11	37
	Mammals	8	50
	Plants	5	37
Schleswig-Holstein	Amphibians	2	60
	Fish	10	46
	Invertebrates	8	54
	Mammals	8	53
	Plants	5	7
Denmark	Amphibians	2	83
	Fish	9	77
	Invertebrates	12	87
	Mammals	7	140
	Plants	8	37

h) Short description of the designation process and subsequent updates (update in designated sites and in species and habitats present)

The designation process has taken several steps from the start of the Birds directive in the early 80'ties until today. Most of the SPA's were designated in Denmark in 1994 and in The Netherlands in 2000 after an EU court decision. The designation process of the SAC's started in the 90'ties and after several delays in all three countries, especially in Germany, with many local protests, the ruling of the EU Court of Justice helped finalize the designation process. In Denmark, EU adopted the designation in 2004 and in the Netherlands and in Germany the process has continued up until now. The terrestrial sites were the first sites to be adopted and the marine sites followed shortly after.

i) The involvement of NGOs and the European Commission's reaction to the initial appointment

NGO's have been involved the designation process from the beginning. They have contributed with relevant knowledge to the proposed sites and all NGO's with input in designation process have been invited and consulted by the EU commission in their final adoption of the designated sites.

j) Total area with intensive agricultural production in each Natura 2000 site and in percentage of all Natura 2000 sites

Based on GIS analysis, the area of intensive agricultural production, both in hectares and in percentages of the site area, are shown for each country in Table 9. Intensive grassland is included in the German figures and in the Dutch figures in parentheses. Without the permanent grassland, the Dutch area of intensive agricultural production area is lower than in the Schleswig-Holstein and Denmark.

Table 9. Percentage intensive agricultural land in Natura 2000 sites. Intensive grassland are included in the German figures and in the Dutch figures in parentheses.

Country	Area of int. agric.	N 2000 Percentage
The Netherlands	230 km ² (460 km ²)	8 % (16 %)
Schleswig-Holstein	110 km ²	10.5 %
Denmark	466 km ²	14.4 %

k) The percentage of area in a 100 meter buffer outside the Natura 2000 sites with intensive agricultural production

In a 100 m buffer around the Natura 2000 sites, the total land area and the percentage of intensive agricultural production are shown in Table 10. The 100 m area around the few large Dutch sites are significantly lower than the 100 m area around the many small German and Danish sites. However, the percentage area of intensive agricultural production is almost similar in The Netherlands and in Denmark, whereas the percentage of intensive agricultural area are almost twice as large in Schleswig-Holstein. This indicates that just around the German Natura 2000 sites, agricultural production is just as intensive as in the rest of the Schleswig-Holstein agricultural land, whereas the agricultural production close to the Danish and Dutch sites is less intensive.

Table 10. Percentage intensive agricultural land in a 100 m buffer zone around Natura 2000 sites

Country	100 m land area	% int. agriculture
The Netherlands	291 km ²	32 %
Schleswig-Holstein	612 km ²	62 %
Denmark	788 km ²	36 %

l) Number and total area of livestock farms in the Natura 2000 sites and in a buffer of 1000 and 2000 meters outside the N2000 sites

In two buffer zones of resp. 1000 m and 2000 m outside the Natura 2000 sites, the intensive agricultural area occupied by livestock farms and the percentage of the total area are shown in Table 11. The Danish agricultural area in the two buffer zones are slightly higher than the Dutch area, and so is the percentage of intensive agricultural land occupied by the livestock farms as well. More importantly, the percentage intensive agricultural area is equal in the two zones for both countries, implying that there is no distance effect around the Natura 2000 sites. The effect seen in the 100 m zone, of less agricultural activity, is no longer visible, and the agricultural percentage is equal in both the 1000 m zone as well as the 2000 m zone. For Schleswig-Holstein, the area shown is the total agricultural area of all farms, and the percentage of the total area, and thus not comparable to the Danish and Dutch figures. Never the less, the figures show the same lack of distance effect around the Natura 2000 sites, with no increasing or decreasing percentage of agricultural land with increasing distance from the sites.

Table 11. Percentage intensive agricultural land of livestock farms in a 1000 m and a 2000 m buffer zone around Natura 2000 sites

Country	Agri. Area 1000 m	Agri. pct 1000 m	Agri. Area 2000 m	Agri. pct 2000 m
The Netherlands	1261 km ²	18 %	2364 km ²	18 %
Schleswig-Holstein	3907 km ²	67 %	8570 km ²	68 %
Denmark	1670 km ²	24 %	3502 km ²	25 %

The number of livestock farms within the 1000 m and 2000 m buffer around the Natura 2000 areas are shown in table 12. The German figures are an estimate based on the percentage of farms registered in the respective municipalities. Relative to the agricultural area there is no distance effect in these figures either.

Table 12. Number of livestock farms in a 1000 m and a 2000m buffer zone around Natura 2000 sites

Country	Livestock farms 1000 m	Livestock farms 2000 m
The Netherlands	X farms	X farms
Schleswig-Holstein	3057 farms	6634 farms
Denmark	2215 farms	4450 farms

3 The state of nature and effort

a) To what extent is the assessment of the state of the Natura 2000 sites based on data from the national monitoring programme

In all three countries, the assessment of conservation status is based on a national monitoring programme. In Denmark, the National Monitoring and Assessment Programme for the Aquatic and Terrestrial Environments (NO-VANA) provides data for both habitats and species. Data validation, data analysis and reporting is performed by Aarhus University.

In the Netherlands, the species monitoring is based on volunteers as well as expert from NGO's in a top-down approach on a national scale. The habitat monitoring however, is executed by experts from nature conservation organisations or private companies in a bottom up approach on a site or local perspective. The Central Bureau of Statistics validates species data but not habitat data.

In Schleswig-Holstein, the data collection is performed by the Länder and the final data processing by the Federal Agency for Nature Conservation (BfN).

In the 2019 Article 17 reporting, the EU commission expects all assessments of structure and function to be based on a "complete survey or a statistically robust estimate" from national monitoring data.

b) The indicator trends and overall development in conservation status of the terrestrial habitat types in the period 2004-2015 in the Natura 2000 sites

The overall development of the conservation status of the terrestrial habitat types are presented in **Figure 1** a, b and c. The information is derived from the national reports, and the German figures reflect an aggregation of all German Länder, not only Schleswig-Holstein. A large portion of the German and Dutch habitat types seems to have a negative trend in the period 2007-12. In contrast the Danish habitat types are dominated by stable or unknown trend. The trends are an aggregation of the four status assessments in the overall conservation status assessment and therefore not necessarily identical to the development in the structure and function status. A trend analysis of the indicators in the Danish habitat monitoring showed that the majority of the indicators had a stable development, 29 percent had a negative trend and only 8 percent had a positive trend.

Figure 1a. Trend in conservation status of the Dutch terrestrial habitat types (1100 serie is excluded). Source: Article 17 report Habitat Directive period 2007-2012.

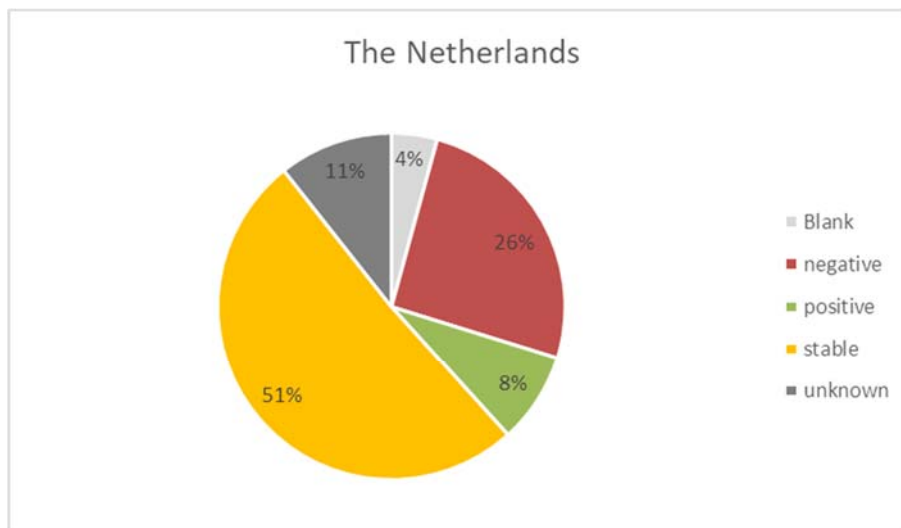


Figure 1b. Trend in conservation status of the German terrestrial habitat types (1100 serie is excluded). Source: Article 17 report Habitat Directive period 2007-2012.

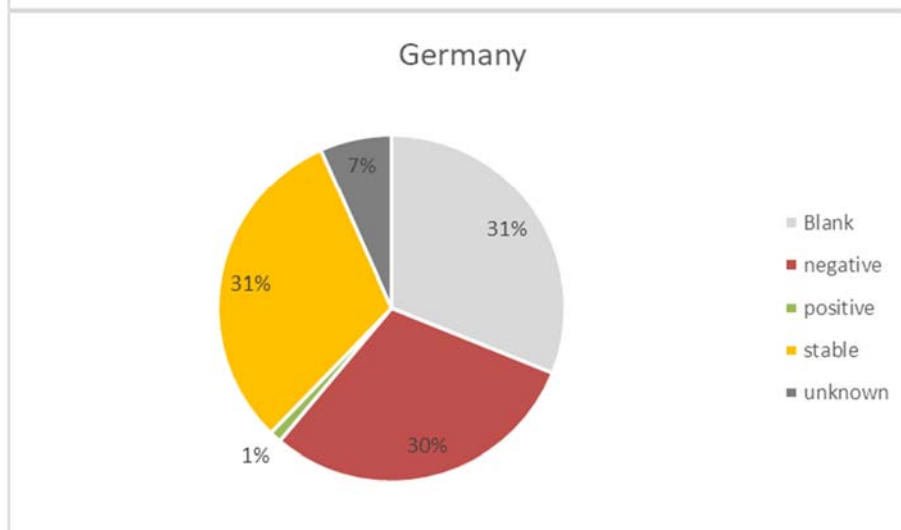
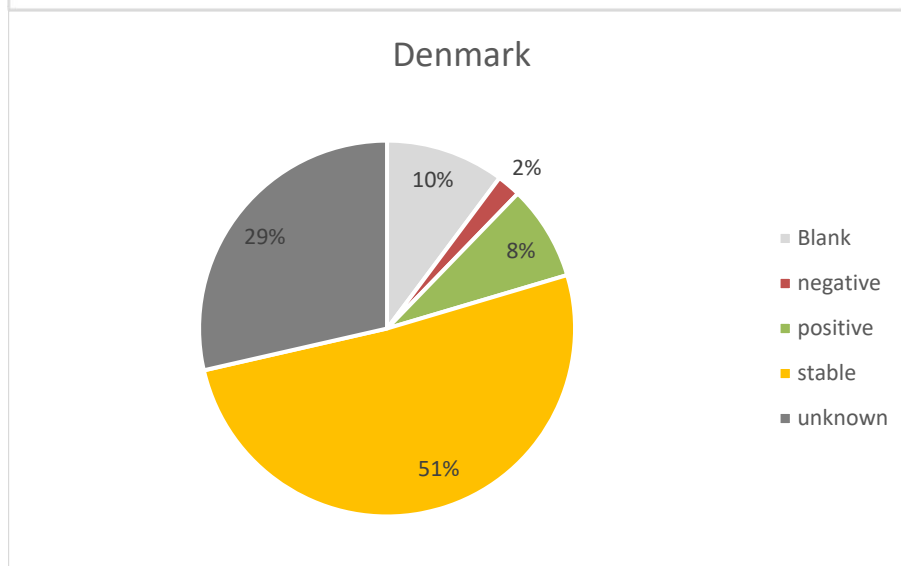


Figure 1c. Trend in conservation status of the Danish terrestrial habitat types (1100 serie is excluded). Source: Article 17 report Habitat Directive period 2007-2012.



c) Low, medium and high pressure factors giving rise to the changes in the habitat types

For Article 17 reporting *pressures* are factors, which are acting now or have been acting during the 6-year reporting period, while *threats* are factors expected to be acting in the future (12 years ahead). Pressures and threats are

reported separately. The total list of pressures and threats used for the assessment can be found on the Article 17 Reference Portal (See http://bd.eionet.europa.eu/activities/Reporting/Article_17/reference_portal).

The relative importance of a threat or pressure are ranked in one of three categories:

- High importance/ impact (H): Important direct or immediate influence and/or acting over large areas.
- Medium importance/ impact (M): Medium direct or immediate influence, mainly indirect influence and/or acting over moderate part of the area/acting only regionally.
- Low importance/ impact (L): Low direct or immediate influence, indirect influence and/or acting over small part of the area/ acting only regionally.

The main pressures identified in the Article 17 reporting in 2013 were airborne nitrogen pollution, lack of grazing, invasive species, fragmentation and drainage.

Pollution due to airborne nitrogen is among the most frequently reported high-ranked pressures to Northern European terrestrial habitats. Reports from across the European biogeographical regions show that 'nitrogen deposition' presents the greatest pollution pressure in north-west Europe (EEA 2015).

d) A description of the data and methods used to assess the need for actions (under the Natura 2000 management plans) or other measures

All three countries have set up a national management planning system targeted for the species and habitats for which the Natura 2000 sites are designated. The planning systems are the framework for identifying site conservation objectives and the management needs in each Natura 2000 site as a basis for prioritizing financial means to the implementation of the plans.

In Denmark, a full set of management plans were implemented after public hearings in 2010. A second planning period started in 2016-2020 mainly to prevent encroachment of open habitats, restoring natural hydrology and to reclaim new habitats to reduce fragmentation in the intensively used landscapes. Reducing the ammonia deposition from neighboring agriculture is not considered in the management plans, but referred to the general practice of ammonia regulation.

In the Netherlands, the management plans include a description of the measures needed to reach the planning objectives. The pressures related to nitrogen are addressed by the Dutch Integrated Approach to Nitrogen in Dutch 'Programma Aanpak Stikstof' (PAS), and the Natura 2000 management plans often refer to the PAS instruments.

In Germany, the framework for identifying the status, pressures and threats of the targeted species and habitats within the Natura 2000 Network is set up by a national management planning system. Uniform guidelines from the Federal Environmental Agencies ensure a comparable monitoring across all Federal States (BFN, 2015). The assessment and the actual implementation of the targeted actions are mostly conducted by local nature conservation authorities, planning agencies, voluntary and other nature associations.

e) Nitrogen / ammonia sensitivity in relationship to ammonia regulation:

i) Which nature classification systems are used categorizing ammonia sensitive nature types: Habitat Directive Annex 1, EUNIS, national systems?

In Denmark, two nature classification systems are in use: The Natura 2000 Annex 1 nature types is used for the Natura 2000 areas, with a Danish interpretation manual. For other nature areas protected by the Danish Nature Protection act, a national system for habitat types protected under § 3 of the act is used. For both system, a distinguishing between 'ammonia sensitive' and not sensitive types is used.

In Holland and Schleswig-Holstein, national systems based on local plans are in use together with the EUNIS nature classification system. Translations between the (more detailed) national systems and EUNIS -, and between EUNIS and Annex 1 nature types exist. There is no á priori distinguishing used between sensitive and not sensitive types.

ii) Which nitrogen sensitivity assessments (e.g. critical loads) are used for the different nature types or areas?

Critical loads are used in all countries in different ways. In Denmark, both nationally computed critical loads for biodiversity protection for Annex 1 nature types, and empirically based critical loads from the UNECE Mapping Manual are used. The nature types for the empirical based critical loads are translated from EUNIS to the Danish nature classification systems.

Schleswig-Holstein use the federal German system for critical load calculations. This system is based on the SMB model described in the UNECE Mapping Manual, but with criteria for protection of biodiversity based on calculations with the BERN model. Calculations are based on local data on a 1 x 1 km² grid. The Dutch system used in the PAS system is a computed critical load for each nature types in the national classification system. The critical loads are in most cases based on the preservation of the species composition of plant communities. The computed critical loads are comparably high, probably because the data for plant communities were collected in a period, where nitrogen effects had already taken place. For both Netherlands and Schleswig-Holstein, empirical loads are used as a limit range for the computed critical loads.

iii) How are these classification systems and sensitivity assessments used in the national ammonia regulation in relationship to the Habitat Directive, and other EU and national regulations related to the protection of ammonia sensitive nature types

Critical loads are used in Article 6.3 approval in Schleswig-Holstein and Netherlands. In Denmark, critical loads can be used in Article 6.3 approval for category 3 nature. Critical loads and critical load exceedances are not directly used in Natura 2000 planning in Denmark and Schleswig-Holstein. In the Netherlands, an appropriate assessment has been made for the total PAS system including a separate assessment for each Natura 2000 area. Critical load exceedance is included in this assessment as well as effects of management, restauration and other measures. This system is fully integrated in the Natura 2000 planning.

f) In what year was the national monitoring programme implemented?

The national monitoring programme in Denmark (NOVANA) was initiated in 2004. Prior to this, no nationwide monitoring programme existed for the terrestrial environment. NOVANA covers habitats and species listed in Annex I, II and IV of the Habitat Directive and Annex I with reference to article 4.2 of the Bird Directive.

In the Netherlands, the national monitoring programs have been developed for different purposes. The Network Ecological Monitoring (NEM) started in 1999. The national monitoring program on 'ecosystem quality' linked to the subsidies for nature conservation (SNL) and including as well the mapping and monitoring of Natura 2000 habitat types, started in 2015.

In Schleswig-Holstein, a system to monitor habitat types under Annex I and species under Annexes II and IV has been developed since 2001, and has been implemented since 2008 for the Atlantic and Continental region. It was incorporated into the Habitats Directive Report for the first time in 2013. A procedure for producing the national Habitats Directive Reports, based on close cooperation between the Länder and the federal government, has been established in Germany since the 2007 Habitats Directive Report.

g) In what year was the national Natura 2000 Natura Management Plans implemented?

According to the Habitats Directive, Member States are obligated to adopt conservation measures with appropriate management plans and other measures which correspond to the ecological requirements of the habitat types and species.

In Denmark, the first management plans for each of the 252 Natura 2000 sites were adopted in 2011, covering 2010-15. Revised management plans were adopted in 2016, covering the period 2016-2021.

In the Netherlands, the Natura 2000 management plans - by national law - need to be developed within 3 years after designation of the Natura 2000 areas. Most of the SPA's have been designated in 2000 and the first SAC's in 2007. Almost all Natura 2000 areas have been designated at this moment (June 2017). The process of the development of management plans is still ongoing and only a fraction of the sites has approved management plans.

In Schleswig-Holstein, objectives and measures have been established for almost 80 % of the areas by the end of 2016, for 90 % by 2017, and for all areas by 2018. In Germany, management plans are in place for 1,740 areas (20.4 % of the land area) and are being developed for 591 areas (Bundesregierung 2013). Management plans are scheduled to be developed for the vast majority of areas, so that they give a good indication of implementation progress.

h) Is it possible to document a biological effect of the Natura 2000 management plans in the monitoring data in the period 2004-2015, and if not, when is this effect expected to be significant?

In Denmark, it has not been possible to see the effects in the monitoring data in the period 2004-2015. The first Natura 2000 management plans were adopted in 2011 and the first conservation measures, based on the management plans, have only just been initiated within the recent years, so a biological effect cannot to be expected this soon. The implemented conservation

measures following directly from the plans will mainly counteract the pressures “Abandonment of pastoral systems, lack of grazing”, “Invasive non-native species” and “Problematic native species”. The effects of this management will be monitored in the period 2018-2021, and a significant positive development within the Natura 2000 sites will probably show up in data after the fourth monitoring period in 2024-2027. Further, conservation measures following from general regulation on e.g. ammonia loads, is expected to have a positive effect at a longer term.

Schleswig-Holstein and the Netherlands have developed monitoring systems to follow the effects of management but finds it is too early to document a biological effect.

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