

INSPIRE Implementation at the Ministry of the Environment

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Everybody, The
Ministry of
the Environment's
Secretariat for Data
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At the Ministry of the Environment, we find it important to use INSPIRE wherever this makes sense. This means that the implementation of the Directive does not take place simply because we as an EU member state are under an obligation to implement it. We do this primarily because INSPIRE provides us with a good, extensive and, not least, thoroughly researched methodologically sound framework that can support our own (i.e. Denmark's) efforts in the construction of an infrastructure for spatial information. In this effort, we aim to make sure that INSPIRE forms the foundation for Danish digital governance. This brings INSPIRE's data sets and services into use in the concrete handling of tasks. The implementation of INSPIRE calls for control and coordination, as we focus on a good relation to the digital administration, and in particular the administration of the environmental and nature area. In other words, governance. This article gives an account of the Danish Geodata Agency's role in connection with the implementation of INSPIRE. It also provides examples of implementation projects in the Ministry of the Environment that are based on spatial data sets.

Keywords: INSPIRE, administration, environmental administration, spatial information, governance

The Ministry of the Environment as data systems managing authority for INSPIRE

INSPIRE is first and foremost an environmental directive. That is why the Ministry of the Environment is the authority within the Danish administration that contributes most data sets and services to INSPIRE. The Ministry of the Environment's three agencies, the Danish Geodata Agency (DGA), the Danish Nature Agency (DNA) and the Danish Environmental Protection Agency (DEPA) are all covered by the INSPIRE Directive. DGA and DNA have data sets under all three Annexes, while DEPA has data sets covered by Annex III.

In order to achieve the best possible implementation of the Directive, with an emphasis on collaboration and strategic as well as efficient use of the Ministry's resources and other data and digitisation projects, governance in the form of control, dialogue and coordination is the key to success.

DGA has two roles in connection with INSPIRE: Coordination of the Direc-



tive's implementation and the role as data systems managing authority. The first role includes coordinating the work as national contact and making sure that the INSPIRE principles and the relation between geodata and environmental data are retained. DEPA and in particular DNA are the largest data owners in the Danish environmental area, while DGA is the primary provider of the spatial reference basis, i.e. Annex I data sets.

In recent years, the Ministry of the Environment has worked – from a strategic starting point – on improving the Ministry's data handling within the Ministry's administrations. This has been done on the basis of *Strategi for Miljøfaglige Data* (Strategy for Environmental Data).

Strategy for Environmental Data

Environmental data are one of the most important tools for decision support in the Ministry of the Environment. They are used in many processes, including planning, case handling, policy formation etc. In such contexts, credible, updated and easily accessible data of a uniform quality level are decisive for reliable case handling in the Ministry. The strategy is to support efficient data handling that contributes to the Ministry's tasks being solved on the basis of credible data that have been produced and publicised in accordance with common guidelines.

The strategy contains a number of initiatives that strengthen the individual data owner's possibilities of gathering, registering and distributing data more resource-efficiently on the one hand, and improves the possibility of using data across the Ministry in connection with case handling on the other. The implementation of the strategy is also to ensure that in the future, it will be possible to work efficiently and cohesively with the operation of the systems and data supporting part.

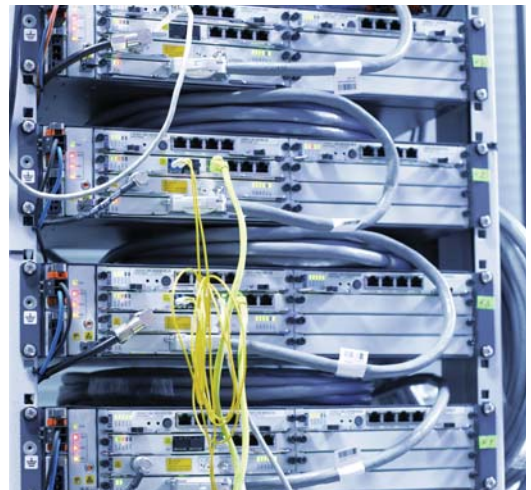
The strategy is an invitation to completing more case-handling tasks on the Ministry's existing WebGIS platform, *SagsGIS*. Interviews and user surveys have shown that a

large potential exists in moving GIS desktop users to WebGIS, as WebGIS solutions have gradually come to contain many functionalities that have previously required a desktop GIS solution. It also proposes a reduction in the use of other GIS platforms so that these are used only when there are particularly well-founded business reasons for this.

With the strategy, it is expected that the Ministry of the Environment can work efficiently with nationwide, updated, credible and easily accessible data sets of a uniform quality. The implementation of the strategy is coordinated in a joint committee across the Ministry.

The Ministry of the Environment's Committee for Digitisation and Data

In order to strengthen the joint work, the Ministry of the Environment has set up the Ministry of the Environment's Committee for Digitisation and Data (MECDD) with representatives from all agencies. The Committee holds the general responsibility for all digitisation work in the Ministry of the Environment.



The Committee therefore sets out the Ministry of the Environment's strategies and policies in the joint public digitisation work and coordinates the INSPIRE work be-

tween DGA, DNA and DEPA. However, the practical coordination of the data work is handled by the Secretariat for Data Coordination (SDC).

In the INSPIRE area, MECDD has appointed a working group that handles the practical INSPIRE work. The working group, which was appointed in 2010, supports the work related to securing cohesion between those INSPIRE data and services that form part of the construction of the infrastructure for spatial information in the EU as well as the data and services that support the environmental administration. The working group also contributes to ensuring that the implementation of INSPIRE is coordinated with relevant external bodies, such as EEA, SEIS and others.

The working group works to ensure that the development of the individual components in the infrastructure considers specific environmental conditions and sends knowledge about the development of INSPIRE back to the institutions. The working group has also clarified the Ministry of the Environment's view on proposals for specifications for INSPIRE data from the European Commission and presented proposals for national coordination of environmental data and services based on the INSPIRE Directive.

In Denmark, digital governance is implemented primarily via the eGovernment Strategy. The strategy contains several initiatives that deal with the environmental area, the data basis and administration of the same. INSPIRE's objective with the construction of an infrastructure, data as the basis for efficient administration of the environment and reuse of systems and resources are all elements that can be recognised in the Strategy. Especially in initiatives 8.1, 8.2 and 8.3.

Efficient environmental administration on a common basis

Efficient environmental administration on a common basis makes up section 8 of eGovernment Strategy 2011-2015. The objective for environmental administration in 2015 is that it will be based on the INSPIRE principles so

that at a national level, we can guarantee an efficient environmental administration in accordance with the eGovernment Strategy. Unified quality-assured environmental data are a prerequisite for efficient streamlining.

Easy access to public environmental data (8.1)

Easy and fast access to credible environmental information is also an important raw material when citizens and companies are to make significant decisions about purchase and sale of homes and properties. A lack of valid digital environmental information is a stumbling block for the establishment of good self-service solutions and automated case processing in a number of areas, e.g. in connection with the sale of properties.

The project has now been completed. Relevant environmental data have been mapped, and a final strategy has been prepared for easy access to environmental data. The strategy has been approved by the Sector Control Group for Digitisation within the Environmental Area, which has handed it over for implementation on the Danish Natural Environment Portal.

Digital overview in the planning area (8.2)

The project is to contribute to realising the objectives under the initiative's section 8.2, i.e. that "...citizens and companies are to have an easier and complete overview of the different plans that regulate the use of an area or a plot of land. At the same time, the authorities' administration of the physical plans is to be made more cohesive, transparent and efficient". The purpose of the project is:

- To provide online access to specific district plan information and provisions, streamline the use of district plans and ensure that the plans can be included in digital solutions such as *Min Digitale Byggesag* (My Digital Construction Case) and other self-service solutions.
- To improve the quality of the plans.
- To describe how a solution can be reused in connection with standardisation and digitisation of



other plan types, e.g. municipal plans, wastewater plans, heating plans etc.

Quality and declaration of environmental data (8.3)

Data about surface water are currently available in several separate databases, from which it is not immediately possible in any efficient way to use data across the systems in relation to administrative tasks, including the preparation of building survey reports, plans, efforts etc. As these data are not standardised, and only quality-marked in part, the following measures are needed in relation to surface water data:

- Standardisation of data and metadata
- Standardisation of quality-marking
- Implementation of methods for ensuring that quality-marking is carried out
- Establishment of one common infrastructure for surface water data, including one common database
- Establishment of a standardised interface for entering new data, including from authorities, laboratories and others who collect and analyse measurement data
- Establishment of an interface for the public's access to data via the unified public infrastructure and Denmark's Area Information (DAI)
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The Danish Natural Environment Portal

The Natural Environment Portal is a service provider of-



fering INSPIRE data, among other things. The portal's general purpose is to support the environmental authorities in their task solution and provide a uniform and updated data basis for the environmental area, promote digital governance procedures within the environmental area and improve communication to the public. The Natural Environment Portal's map 'Area Information' contains information about water, nature, preservation, nature protection, agriculture, noise and much more.

Today, the Natural Environment Portal displays the Danish Nature Agency's three data sets under the INSPIRE Annex I geodata theme Protected sites. The three data sets fall under the Natura 2000 project: Bird protection areas, Ramsar areas and Habitat areas.

The Water data programme – part of 'Expansion of the authoritative geographical core data' (10.1)

Many public institutions solve tasks in relation to water-courses and lakes with different perspectives. Negotia-

tions about the distribution of the financial costs of watercourse regulation take place on an ongoing basis. The work related to watercourse data is also characterised by complex legislation and rules. Several registers of watercourses are kept by both the government and the municipalities. The registers are organised on the basis of various legislation, while the administrative division of players is based on various professional dimensions, such as environment, hydrometry, hydrology and topography.

Today, there is no single unified nationwide core data set for watercourses (INSPIRE Annex I *Hydrography*) to ensure that there is a connection between different authorities' watercourse data across administrative borders. The result is less efficient case handling in the watercourse area, while at the same time, the same data are maintained and purchased several times.

The lack of cohesion in the area is a barrier against a future climate adjustment effort becoming effective and cost-effective. The purpose of the project is therefore to establish unified core data for water management and climate adjustment across Denmark.

As mentioned earlier, in Denmark we are working to ensure that INSPIRE will become – wherever this makes sense – the foundation of the digital administration. In concrete terms, this is being implemented by including INSPIRE's framework and methodology in the Danish Agency for Digitisation's regulations for the authorities' modelling of core data. The Danish Geodata Agency has set up a modelling methodology for the data that the Agency is responsible for, based on INSPIRE. The data modelling method takes its starting point in the listed principles that apply to Delivery 1 in accordance with the INSPIRE Directive.

Common method for the development of data based on INSPIRE's methodology system

The method is to ensure that the development of the structure for the displayed data is based on UML models with appertaining integrated documentation. Connect-

ed information models are used for display in the Data Distributor for INSPIRE and new unified public data deliveries.

INSPIRE's data models with their object types' related properties meet many administrative needs. However, there may be national needs for data content that are not covered by INSPIRE. These needs are also a part of the methodology, which makes it possible to model the needs as extensions (wherever possible) to INSPIRE's object types.

The aim of the methodology is the greatest possible automation in order to support the core data projects, e.g. by means of tool-supported generation of charts for data interfaces with appertaining documentation material based on UML models. The model is to result in the implementation of a multi-functional data distribution for application of topographical reference data.

In general terms, the methodology will support the implementation of the European infrastructure for spatial information, INSPIRE, and for the project 'European Location Framework (ELF)', in which actual tools for

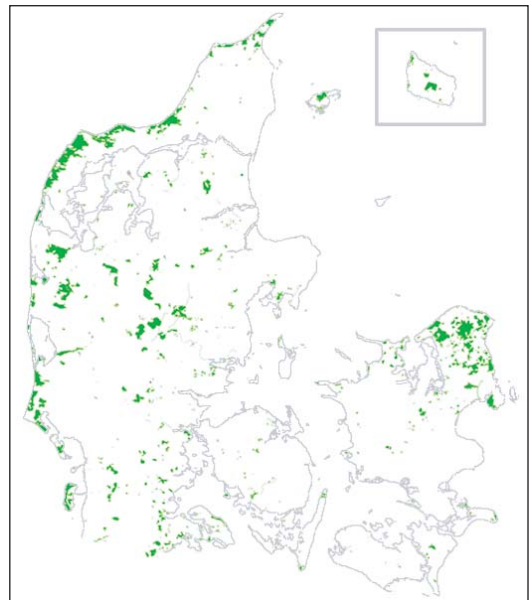


Figure 1. State-owned forests in Denmark (from <http://naturstyrelsen.dk/naturbeskyttelse/skovbrug/>)



support of the countries' INSPIRE implementation are developed and demonstrated. One example of this is a tool that can help combine and harmonise data across national borders.

Data projects in the Ministry of the Environment – two examples

In addition to the Ministry of the Environment's work under the auspices of the eGovernment Strategy, there are implementation projects based on geographical data sets of which the majority are covered by INSPIRE.

The projects have the following titles:

1. Sustainable land management
2. Strategic mapping of noise-loaded areas in Denmark

Sustainable land management

At the Danish Nature Agency, one of the key projects is to reorganise all geographical and non-geographical data related to land management and timber cutting in state-owned forests. The first step was to convert 933 forest maps with related themes from a CAD format into a GIS format. At the same time, the georeferences were adapted to the current forecast.

The next step in the process was to retain the newly

formed GIS themes, going from 180 to 65, while making all texts searchable on GIS. It is very important to the Danish Nature Agency that all geographical and non-geographical data can be used by everybody internally as well as by other parties in the public sector. It is also important to ensure that a data set is only maintained in one place and that the data owner checks the data.

The Danish Nature Agency expects the project to deliver the relevant input for a new consolidated database. The implementation of the project is to support the Danish Nature Agency's objectives and business processes by staff at the Agency using the data. The data do not always live up to the INSPIRE principles, but they are converted into the INSPIRE format when this is necessary for reporting purposes. Data included in the project:

- LOOK OUT mapping: A map that shows which areas must not be touched when felling (also in demand for certification and preservation purposes)
- Work planning, operations planning, felling, tree growth, logistics and price formation
- Natura 2000 mapping
- Maintenance of recreational areas
- Maintenance of forest maps (maps of woodland rambling paths etc.)



Figure 2. Example of strategic noise maps for large road in the northern part of Zealand – daytime values.

Strategic mapping of noise-loaded areas in Denmark – download of data

The Danish Environmental Protection Agency is helping to make the noise map a part of the strategic noise mapping in the EU, which shows the total number of EU citizens who are troubled by noise from infrastructure facilities in large urban areas. Geodata for noise-loaded areas are relevant INSPIRE data for the geodata theme 'Human health and safety'.

The strategic noise map is not legally binding, and it is not based on physical noise measurements. Instead, the noise load is modelled in computer programs based on traffic censuses of vehicles, trains and aeroplanes as well as the topography and climate of urban areas. The detailing degree is less than for the modelling of noise in connection with the authorities' case handling.

When you log onto the noise map, you see the most recent map – see <http://miljoegis.mim.dk/?profile=noise>. In the map (fig. 2, page 26), you can choose to see the different noise types (road noise from large roads, road noise in cities, train noise, aeroplane noise, industrial noise in cities) and choose whether to see noise data ex-

pressed as day or night values. Finally, you can see quiet areas by Billund and in Frederiksberg by Copenhagen.

Reporting includes all maps from 2007 and 2012, respectively, about trunk roads (large roads), railways, the City of Copenhagen, and more than 50 % of the municipalities in the capital region. Reporting also includes the municipalities of Aalborg and Odense and the City of Aarhus.

The search service geodata-info.dk

INSPIRE has caused each member state to establish a search service in which data sets and services are described by means of metadata. This is an important element in the infrastructure – the amount of accessible data has never been greater, and data are included more and more often in the administrations' decision basis.

The large amount of data and the many data providers pose great demands on metadata: The user needs to be able to assess a data set's current relevance, accuracy, usability and accessibility before downloading and using it – for instance in a decision-making process or an authority's ruling.

The Danish search service is called geodata-info.dk.



In order to use resources as best as possible, reuse components and avoid duplicate work, the service has been developed in collaboration with the other Nordic countries. Furthermore, it has been developed as an Open Source component.

The service is built around the paradigm 'Publish-Find-Bind'. To put it briefly, 'Publish' indicates that a data or service owner can create metadata for data sets or a service on the portal (geodata-info.dk), by uploading an XML file that complies with the metadata profile, or finally by a system-to-system action where metadata can be harvested from a local metadata database to geodata-info. 'Find' indicates that a user can look for a data set or service via metadata on the portal or in an application (e.g. desktop-GIS), which is connected to the service interface at geodata-info, from which metadata is displayed. Finally, 'Bind' indicates the user's possibility of gaining access to data – via metadata. This is possible because the metadata profile includes information about where and how data is accessible.

Concluding remarks

As of today, in 2014, we have yet to see the full potential of INSPIRE. There are several reasons for this. The implementation is under way in the member states, and not all data sets are accessible in keeping with INSPIRE's data models. In Denmark, a number of data sets covered by the Annex I geodata themes are accessible as INSPIRE data. The data systems managing authorities covered by

the Directive's Annex II and III will be working through to the end of 2015 on bringing their data sets into line with INSPIRE's data models.

At a European level, a use of INSPIRE is encouraged that the Ministry of the Environment approves of, i.e. reporting in relation to EU Directives. Reporting in relation to a number of thematic EU Directives, particularly concerning the environment, nature and planning, is based on spatial data. A large part of these data is either already contained in a number of INSPIRE's data models, or the Commission can expand them with extra object types and property data, which will bring the data models into line with the reporting requirements in the thematic directives.

This kind of use of INSPIRE requires coordination and collaboration on making INSPIRE the data basis for reporting in relation to thematic directives. It also poses demands on the member states, i.e. that the relevant administrations, e.g. the Ministry of the Environment, are willing to implement the expanded data models with the additional object types and property data that are required for the reporting. Through this, INSPIRE will cause a streamlining in the reporting tasks.

INSPIRE makes good sense for a number of the Ministry of the Environment's administrative areas, and it contributes principles, a framework, standards and models for data initiatives and in the process of constructing the digital administration under the auspices of the eGovernment Strategy.

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