Spatial Data Infrastructures in *Sweden*: State of play Autumn 2006

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Executive summary

The NSDI in Sweden is highly visible and accessible to the broad user community through publicly accessible Internet sites such as MapStore, MapSearch and Property search services. The NSDI web portal is presently hosted by the National Land Survey which can be regarded as the executive coordinating body for the NSDI.

Much of the information contained in the Swedish SDI is developed out of the Land Data Bank System (LDBS), the Land Use Map and the Topographic Map service. As such, the NSDI forms an essential part of the country’s Public Sector Information.

The basic components of the Swedish NSDI are:

- Information - different datasets with specific focus on reference datasets that form the foundation on which other spatial data sets are built. Metadata forms another important part of the information but seems to be less developed;
- Legislative and institutional frameworks;
- Human resources, technical systems and processes;
- Strategies and action plans.

The Swedish approach regarding the capture, storage and use of data and especially geographic data is one where the national, regional and local levels appear to be well interlinked. The Swedish NSDI strongly incorporates cadastre-based information.

In Sweden the NSDI is seen as an agent of change, and a number of drivers are promoting the idea of the NSDI and likewise the NSDI is acting as a driver itself, promoting change in how tasks are done in business and government sectors.

Additional drivers for the NSDI include the needs of stakeholders such as Municipalities which migrate their Master Plans and their planning processes into GIS environments, as well as the Swedish Environmental Protection Agency which is working together with NLS to build up the components for its own thematic SDI.

The County Administrative Boards are also important drivers for the NSDI as GIS users and producers at regional level.
Table of Contents

CHANGE MATRIX 2006 VERSUS 2005 ................................................................. 1

EXECUTIVE SUMMARY ................................................................................. 2

TABLE OF CONTENTS ..................................................................................... 3

ABBREVIATIONS AND ACRONYMS ................................................................. 4

1 GENERAL INFORMATION ........................................................................... 5
  1.1 METHOD ................................................................................................. 5
  1.2 BACKGROUND OF THE SWEDISH NSDI ................................................. 5

2 DETAILS OF THE SWEDISH NSDI (NLS) .................................................. 7
  2.1 GENERAL INFORMATION ................................................................. 7
  2.2 COMPONENT 1: COORDINATION AND ORGANIZATIONAL ISSUES ............ 8
  2.3 COMPONENT 2: LEGAL FRAMEWORK AND FUNDING .............................. 8
  2.4 COMPONENT 3: DATA FOR THEMES OF THE INSPIRE ANNEXES .......... 14
  2.5 COMPONENT 4: METADATA .............................................................. 19
  2.6 COMPONENT 5: NETWORK SERVICES ............................................... 20
  2.7 STANDARDS ....................................................................................... 22
  2.8 COMPONENT 6: THEMATIC ENVIRONMENTAL DATA .............................. 23
  2.9 USE AND EFFICIENCY OF SDI ......................................................... 29

3 ANNEXES ................................................................................................. 31
  3.1 LIST OF SDI ADDRESSES / CONTACTS FOR SWEDEN .......................... 31
  3.2 LIST OF REFERENCES FOR SWEDEN .................................................. 32
Abbreviations and acronyms

CT       Core Thematic Data
FIR      Further Investigation Required
GI       Geographical Information
GINIE    Geographic Information Network in Europe
GIS      Geographical Information System
GPS      Global Positioning System
GSD      Geographical Sweden Data
GSDI     Global Spatial Data Infrastructure
INSPIRE  INfrastructure for SPatial InfoRmation in Europe
LDBS     Land Database
LIS      Land Information System
MEGI     Metadata for Geographic Information
NAP      National Amsterdam Peil
NLS      National Land Survey
NSDI     National Spatial Data Infrastructures
PRTR     Pollutant Release and Transfer Register
PSI      Policy and legislation on access to public sector information
REF      Reference data
SDI      Spatial Data Infrastructures
SEK      Swedish Crown
SEPA     Swedish Environmental Protection Agency
SGU      Geological Survey of Sweden
SIS      Swedish Standards Institute
SMHI     Swedish Meteorological and Hydrological Institute
SNRD     Swedish National Road Database
SS       Swedish Standards
STANLI   Swedish programme on geographical information standardisation
UELN     United European Levelling Network
ULI      Utvecklingsradet for landskapsinformation (Swedish Development Council for Land Information)
VAR’s    value added resellers
VERVA    Swedish Administrative Development Agency
WISS     Water Information System for Sweden
1 GENERAL INFORMATION

1.1 Method

This report is summarizing the review of SDI in Sweden, and reflects the degree to which the SDI situation is similar to the ideas set out in the INSPIRE position papers and in the more recent INSPIRE scoping documents.

The report is based mainly on the analysis of web sites and other documents readily accessible including:

- [http://www.lantmateriet.se/index_eng.htm](http://www.lantmateriet.se/index_eng.htm)
- [http://www.sis.se/stanli](http://www.sis.se/stanli)
- [http://www.stadskartan.se/start/](http://www.stadskartan.se/start/)

and has been completed by integration and consolidation of comments received in spring 2003 and summer 2004 from representatives of the NSDI initiatives. The update of 2005 was based on input from Swedish experts and integrated in the report. The update of 2006 was based on input from Swedish experts and the country visit that was performed on 27-28 November 2006.

1.2 Background of the Swedish NSDI

The Swedish NSDI consists of a network of supporting actions and services aiming to facilitate an efficient production and use of spatial information. This includes increased cooperation between authorities, municipalities and private sector companies in development and implementation of GI standards, in establishment of efficient updating processes and to set up metadata services and Internet based services for easy access and distribution of geographic data.

The Swedish approach regarding the capture, storage and use of data (and especially geographic data) is based on a common understanding of the need for cooperation between responsible agencies, including creation of efficient links between national, regional and local levels. Geographic information in Sweden is collected mainly at the national level and the Municipal level, although the 21 Counties are becoming increasingly involved in spatial data collection and use. New GIS activities will also be initiated as a result of the implementation of the Water Framework Directive. Five of the County Administrative Boards have been designated as competent water authorities of the five Swedish river basin districts. The 290 Municipalities are the responsible

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1 INSPIRE position papers, final versions: RDM, ETC, DPLI, ASF, IST, IAS (latest version).
2 Including the analysis of various documents, project references and web sites readily accessible. Most resources were gathered from the Internet. Throughout the report a distinction is made between actual SDI initiatives and GI and GIS based projects. Key elements that should be in place for an SDI to exist are: Status - strategy (or mandate) for SDI to be developed and not a one-off effort; Coordination - who will administer and organise the SDI; Scope - broad based interest and stakeholder involvement; Promoting - awareness, documentation, access; Funding - dedicated resources, a clear plan to pay for it; Partnerships - getting players on-board.
authorities for the large scale mapping as well as the maintenance of key databases through their administrative processes.

Geo-portals that offer this spatial/geographic data and services are pertinently available. However, there is no national portal that offers access to all available data on both national and local level. Today SDI activity at the national level is very complete and up-to-date regarding the combination of data, applications and technology, and the approach to the provision of services. Other SDI activities in the country are either not evident or they have been integrated into the existing NSDI framework.

The information offered by the Swedish NSDI is mainly developed out of the Land Data Bank System (LDBS), the Land Use Map and the Topographic Map, and all are based on the National Geodetic Network. The NSDI forms an essential part of the Country’s Public Sector Information, or PSI. Besides the reference GI, the basic components of the Swedish SDI are:

- Metadata;
- Legislative and institutional framework;
- Human resources, technical systems and processes;
- Strategies and action plans, especially for interoperability and information dissemination.

The NSDI is hosted by the National Land Survey (NLS) of Sweden. The NLS is a governmental agency and the first Swedish authority to have a commercial presence on the Internet with the MapStore service. Other Internet-based services and applications available include Property search, SwedeImages and MapSearch.

Although many building blocks were in place, there was not an actual NSDI in place in Sweden until the mid 1990’s. It required the coordination of organisations, information, systems and technology. Key to this process and specific to the Swedish model was the merging of the Central Board of Real Estate Data and the National Land Survey (old) into the new National Land Survey. A key driver or objective behind this change was to bring a geographical dimension to the Land Data Bank System (Wiberg).
2 Details of the Swedish NSDI (NLS)

2.1 General Information

Lantmäteriet (www.lantmateriet.se) -the Swedish National Land Survey (NLS)- is a governmental agency (i.e. part of the state and thus not a separate legal person). It is the dominant player in the GI market. The Ministry of Sustainability (from 1 January 2007 onwards, the Ministry will be renamed to the Ministry of Environment) is the responsible governmental body for Lantmäteriet. Lantmäteriet’s role is to support the creation of an efficient and sustainable use of land, water and constructions. Its main activities are real property information (including cadastral surveying and real property registration), land and property information, credit market system, geographic information (the national geodetic system, the basic geographic data etc.), image information and visualisation, surveying and large-scale mapping, consultancy services, software and training, customised databases and maps, atlases and tourist maps. The NLS has the responsibility to co-ordinate the development of an NSDI. In the field of geo-spatial data this task includes inter alia work with standardisation, establishment of metadata services, co-ordination with other producer's production plans (e.g. the municipalities that create and maintain GI databases) and the establishment of new forms for co-operation.

Lantmäteriet is supported by the GI-Advisory Board (Geodatarad). It has an advisory role towards Lantmäteriet on matters of national SDI, and on European and international matters.

ULI (Utvecklingsradet for landskapsinformation) (http://www.geoforum.se/page/158) is the Swedish Development Council for Land Information. This non-profit interdisciplinary association of Swedish organisations (220 in January 2003) is working for more efficient use of GI. It aims to be an interest body for users, producers and researchers within the field of land information.

Within SIS (the Swedish Standards Institute) a project called Stanli was set up already in 1990 to promote standardization within geographic information. The work is financed by approximately 30 different organizations. Through Stanli Sweden has taken an active part in the ISO/TC 211 and CEN/TC 287 developments of framework standards. Based on results from this work a Swedish framework has been set up. Besides a number of profiles for different application areas have been developed, for example for road and railway networks, utility networks, addresses, cadastral parcels, and hydrology.

The 21 counties are increasingly involved in spatial data collection and use, but it is the 290 municipalities in Sweden which are responsible for large-scale mapping and the maintenance of key databases through administrative processes. The Swedish Environmental Protection Agency (SEPA) produces and processes a lot of data in areas of its responsibility. Other government agencies, such as the National Road Administration, the Swedish Post and others are involved with and co-operate in data production and/or have responsibilities in different user sectors for spatial information.
2.2 Component 1: Coordination and organizational issues

The Lantmäteriet is coordinating of the Swedish SDI. In addition an advisory Council – the GI Advisory Board (Geodatarad) – was introduced, which advises Lantmäteriet about the Swedish SDI and European and international matters. The GI Advisory Board consists of members of Lantmäteriet, the counties, the municipalities, the Geological Survey, the Road Administration, the Meteorological and Hydrological Institute, the Maritime Administration, the armed forces, ULI and the Association for Local Authorities.

Lantmäteriet was given the task by the Ministry of Environment to draw up a national GI strategy by March 2007. This strategy is intended to provide guidance for all players in the GI field in Sweden and will be updated annually. The GI Advisory Board has assigned five drafting teams to work on the following elements of the national strategy: user requirements, metadata, specifications, technical solutions and monitoring, and organization and regulation.

2.3 Component 2: Legal framework and funding

2.3.1 Legal framework

In 2006, the Swedish Parliament approved legislation that officially appointed Lantmäteriet as the coordinator for the Swedish NSDI and setup the Geodatarad.

On the national level, the responsibilities for GI are divided among several ministries. For instance, the ministry of Justice is responsible for the Land Registry, which has been transferred to Lantmäteriet by a parliamentary decision of 2005, taking effect from 2007 onwards. The ministry for Environment is responsible for Lantmäteriet, the administration for physical planning and the Environmental Protection Agency. The Ministry of Industry, Employment and Commerce is responsible for the Geological Survey, the Maritime Administration, the Road Administration, and the Meteorological and Hydrological Institute. Lantmäteriet has agreements with other ministries for the use of its data, such as the Ministry of Finance, the Ministry of Education, and the Ministry of Agriculture, Food and Fisheries.

Lantmäteriet has a strong tradition of cooperation, with other national agencies and with the local authorities. One of the most important cooperation agreements deals with the National Road Database. The database is built in cooperation between the Road Administration, Lantmäteriet, the forest authorities and the municipalities. Another joint effort database is the Address Register. This is built in cooperation between Lantmäteriet, the municipalities, the Post and the National Tax Board. Lantmäteriet also cooperates with the Statistics Office, the National Railway, etc. These agreements usually do not take the form of formal contracts.

Lantmäteriet, the Swedish Environmental Protection Agency (SEPA) and the County Administrative Boards have made an agreement including two parts. On the one hand, they have the purpose to make the collaboration within the field of environment protection more efficient, by building a stable infrastructure, and on the other hand, it
includes GIS support from Lantmäteriet to SEPA. There are plans to make the information in this agreement (VIC Nature) available to the public via the Internet. Lantmäteriet also cooperates with the municipalities. Swedish municipalities have a high level of independence, and they are not obliged to provide any spatial data to the government, except in a few cases, such as maps for planning. 38 municipalities also function as a cadastral authority, under supervision of Lantmäteriet. The cooperation with the municipalities is traditionally based on an incentive model. The municipalities are paid for providing their data, by a division of revenues from Lantmäteriet, depending on the level of data the municipalities provide, and of their population numbers. If the municipalities want to use Lantmäteriet’s data, they have to pay for it.

The common vision for the cooperation between Lantmäteriet and the municipalities is laid down in a general agreement, which lays down the principles for cooperation and the financial model. The Association for Local Authorities has made a framework agreement with Lantmäteriet in 2000, and a new one in 2003. Standard agreements are negotiated with the Association for Local Authorities and are then used for concluding individual agreements with the local authorities. In addition, an object catalogue is made and the use of standards is included in the agreements.

The local authorities also have many cooperation agreements amongst each other, to build common databases, sell them together and divide the revenues. These agreements usually include the right to show the data on the Internet.

In April 2006, the Swedish Parliament organized the EU Interparliamentary Conference on the INSPIRE directive. At that time, the chairperson of the Housing Committee of the Parliament had raised considerable political interest in the issue of geographic information and the role and tasks of Lantmäteriet, and the political climate was very good for organizing the conference and raising political awareness.

However, since April the national elections have changed the composition of the Parliament and the Government. This entails that the interest in INSPIRE and other issues regarding SDI and spatial data will have to be raised again.

Lantmäteriet has started the Elips program for the restructuring of fundamental geo-data. It intends to develop new comprehensive processes for the creation, maintenance, exchange, storage and dissemination of spatial data. Its goal is to define requirements for storage and exchange of basic land data for the overall land information process. The work of Eclips includes the establishment of common concepts and definitions between producers and users; the identification of common information needs, definition of objects and relations between objects; the establishment of system independent models for information exchange and dissemination; and the definition of a common technical interface, i.e. standardized exchange format based on GML.

The program started with an analysis of the processes and roles and the available IT-support. Currently, LM is moving to the implementation phase and is starting with the migration to Oracle Spatial Database. This will replace the internal proprietary systems and programs. The migration should be finished by the end of 2008.
2.3.2 Public-private partnerships

There are private companies (e.g. T-kartor, Liber) who are data producers for certain parts of the NSDI and who are service providers for some forms of spatial information. Thus in Sweden private commercial firms are involved in building the NSDI in different ways. They can be contracted for development works or production works, but also as vendors. Normally, private commercial firms are making "value-added” products out of core data.

Lantmäteriet is supporting the establishment of value added resellers (VAR’s) and has agreed with a number of new companies to be VAR’s during the last year. In this process it has also been important to clearly define the content and extent of core data. Currently, the system of working with resellers is under discussion as possibly inconsistent with Directive 2003/98 on the re-use of public sector information.

2.3.3 Policy and legislation on access to and re-use of public sector information

Further to the Nordic tradition of open access to government files, the citizen’s right of access to government documents is seen as a fundamental aspect of Swedish society. It was first introduced in 1766 by a forerunner to the Freedom of the Press Act (FOI legislation) from 1948 and last amended in 2002. The legislation includes provisions for access to computer files. The Freedom of the Press Act provides for access to documents kept by a public authority (e.g. the parliament, the government, state agencies and municipalities), including electronic documents. All documents drawn up or received by an authority are included. Access to documents is free of charge (“access” means that the citizen has the right to read and look at the document within the office of the agency which always is free of charge). The citizen also has a right to get a copy of the document or an extract from an “electronic document”. The fee for the copy shall respond to the cost for producing the copy (marginal-cost). There is no obligation to make available records for electronic data processing in any form other than printouts. Access can be denied only with reference to a specific clause in legislation demanding secrecy (the Secrecy Act of 1980). In principle, this legislation also covers information held in databases and registers of public authorities. Access to information in data systems and registers are in practice limited to such data that can be extracted and delivered with routine procedures. A selection of information may be requested if retrieval thereof does not require significant effort. For state-agencies the government decides the prices for copies. The purpose of request – commercial interests or not – is not relevant. If information is subject to copyright then whoever has obtained it by citing the Freedom of the press act must respect the rights of the copyrights owner. In general private legal entities controlled by the crown with public tasks are not subject to the access regulations contrary to municipal entities, which are under the access regulations. Government and municipal authorities are currently however organizing their information resources so that they can provide more information electronically. These activities are services directed to the society and the citizen by the agencies and they are formally based on a regulation (Art 4) in the Administrative Procedure Act.
A limited number of larger national databases and public registers are by law authorized to be used for commercial information services (addresses to persons and companies, real estate and land information, vehicle information, etc.). Within the business sector, such information can then be used for value added services. Pricing of the public information is normally based on a cost recovery principle.

Directive 2003/4 on access to environmental information and Directive 2003/98 on the re-use of PSI have been transposed into Swedish law. The Swedish authorities believed that no changes to the legislation were necessary to implement Directive 2003/98. Currently, the Swedish Administrative Development Agency (VERVA) is working on a guideline regarding the application of the PSI directive within the Swedish public sector. VERVA’s main task is to support cooperation between public authorities and with the private sector, with the main focus on e-government. It has the mandate to issue instructions to administrations and agencies regarding information management. Municipalities are not bound by these instructions, but they can follow them voluntarily.

### 2.3.4 Legal protection of GI by intellectual property rights

The Crown claims copyright to geographical information produced by and for Lantmäteriet. The Lantmäteriet administers the copyright on behalf of the Crown. The Crown also uses the database protection *sui generis* as supporting protections means on geographical and on real estate registers information in certain cases. The municipalities, the biggest producer of maps in Sweden, also claim copyright and *sui generis* protection to their maps and databases.

The current Swedish Copyright Act dates from 1960 (Law no. 729 of 30 December 1960, as last amended by Law no. 665 of 6 July 2000).

Article 49 of the Copyright Act provides for the protection of catalogues, tables or similar products that contain a large amount of items of information. Article 49 also details the *sui generis* protection for databases. The protection lasts for ten years after initial publication. The protection exists in addition to copyright.

In addition to photographs being able to attract copyright (if original), all photographs are protected by an exclusive right of reproduction according to article 49a of the Copyright Act. This right subsists until 50 years after production.

Following article 9 of the Copyright Act, laws and other regulations, decisions by public authorities, reports by Swedish public authorities and translations of the aforementioned documents are not subject to copyright. The law specifically states that among others maps and drawings that form part of the documents listed in the first paragraph of article 9 are protected by copyright (if, of course, they meet the general criteria set for copyright protection). Although works of public authorities other than those mentioned above may be subject to copyright, there is a general right for everybody to access and get a copy of them in accordance with the regulations in the Freedom of the Press Act (art. 26a). The documents can normally be used freely but there is a number of exceptions. Works that pertain to geographical information: maps, computer programmes, technical models,
works which are the result of scientific research and works that are commercially exploited by public authorities may not be freely used (art. 26 § 3).

The 1993 Act on the Protection of Land Information contains provisions that limit the free production and distribution of certain types of GI. The purpose of this legislation is to regulate and control the use and dissemination of GI from national security-reasons. The production of aerial photographs is with the exception of smaller parts of the country free. Building databases with land information, dissemination of aerial photographs, certain maps and land-information in digital form is subject to approval of the authorities for reasons of national security.

Sweden has transposed the 2001 directive on copyright in the information society in May 2005.

2.3.5 Restricted access to GI further to the legal protection of privacy

On 24 October 1998 the Personal Data Act (1998:204) came into force and replaced the out-dated Swedish Data Act from 1973. The Personal Data Act is based on Directive 95/46/EC. Section 33 of the Act was amended in 1999 to implement the EU Directive on the transfer of personal data to a third country. Data protection applies to a large amount of government information, including the SPAR population database, certain types of statistics, certain types of real property information and geographical information (addresses, real estate unit number), vehicle registries and VAT files.

Sweden has transposed the 2002 directive on privacy and electronic communications into national law.

2.3.6 Licensing framework

The pricing model for fundamental geographic data is based on decisions by Parliament and Government. When it concerns data from Lantmäteriet the framework for pricing and licensing is decided by the board based on the overall model and economic targets being decided by Government.

There is no delivery of data directly from Lantmäteriet, but requests for information have to go through a system of resellers. The government’s position is that the real users should pay for the data and that the price level and organization should not hinder the availability of the data. An increasing number of services is also directly available on Lantmäteriet’s website. The viewing services are free of charge, but downloading data is charged for.

2.3.7 Funding of SDI and pricing policy

Lantmäteriet is financed for 20% by government grants, and for 80% by fees of different kinds. Its turnover is approximately 170 million €. The fees come from three sources: licenses for using data, orders for property information services, and consultancy services.
The work of ULI is mainly financed by membership fees and by a NLS grant and revenues from conferences and from sale of publications. The member fees vary between type and size of organisation.

With regard to the standardisation work, the framework is financed by different organisations, mainly state authorities, but also some private enterprises. The Swedish Standards Institute (SIS) is co-ordinating this work and sets up the agreements with the contributing organisations. In some cases organisations set up agreements directly with SIS. With regard to the applied standards (e.g. standards on road networks, utility networks, addresses etc.), for each of these standardisation activities, a group of interested bodies are set up and it is up to the participating organisations to finance these specific activities.

For some GI projects Sweden receives financial contributions from the EU.

Rather limited funds have specifically been allocated by the government to establish the NSDI activities. Funds have been raised for fostering standardisation and for development of metadata services. The different governmental authorities have however, spent substantial amounts of money on developing datasets, standardisation, establishment of efficient methods for delivering data etc. According to Wiberg, the annual cost for managing the NSDI is around 30 million EURO.

Sweden has a long tradition of value-added publishing among government agencies, many of them being dependent on extra income. The exploitation is decided case by case and is a non-profit activity. No government agency is allowed to sell information from databases or registers unless specifically allowed to do so by government or parliament. Only a limited number of agencies have such permission which is given on a case-by-case basis.

The possibility exists that a state agency, if they do have the formal grounds for it, acts on the market in competition with other market actors. Lantmäteriet has such a division, called Metria.

Pricing

The framework for public fees is found in several laws. For the government and the state agencies the central regulation is found in the Instrument of Government (constitutional law), which is a part of the Constitution and in the Ordinance on Fees. For the municipalities, the Municipality law regulates the rights to decide fees.

In general two types of fees can be determined. Fees for a service which the citizen is forced to use are similar to a tax. The power to decide such a fee is constitutionally given to the parliament and the municipal council. The power can be transferred to the government or even to a state agency. The fee shall only cover the cost for the service. Another type is the fee for services which the citizen is free to use. The power to decide on such fees within the state administration is placed on the government, which can transfer this power to an agency. Such a fee should only cover the costs for the service. If a fee should allow a profit, the parliament should decide this.
Lantmäteriet and the Environmental Protection Agency are ruled under traditional conditions for agencies. That means among others, that the pricing of the agency services and products shall give no profit and only mirrors the costs. The general principle is that a state agency is not allowed to decide prices for its product/services unless the parliament or the government has decided that it can do so.

The government has given Lantmäteriet the right to set fees for services from the real property register and set principles for license fees for use of GI. Such a fee shall cover the cost for producing the document, the costs of dissemination plus a contribution for support and maintenance of the system used, which thus constitutes a modified marginal cost principle. The pricing involved is intended to generate no profit, but some users are thought to see it as expensive. Before the new budget year the government prescribes in a special decision after the budget has passed the parliament, what, how, etc, the agency shall fulfil their objectives. In the decision, the government gives instructions and power to the agency for decisions on the fees. Since 1995 Lantmäteriet shall calculate its fees on information from the Real Property Register and for geographical information with the modified marginal cost principle described above. The fee for products, which contain the said data, shall cover the cost for dissemination but also a contribution from the user, which shall be used for maintenance and support of the technical milieu in which the information is processed and distributed from. The principles for pricing rest on a statement made by the Parliament. Following those principles government decides for each year to what extent the users of the basic geographic and land information shall contribute to the costs for maintaining the databases. In 1998 the users’ maximum-contribution was 100 million SEK, which is approximately 20 percent of the annual costs for the production and maintenance of the basic datasets. The users also have to pay for the actual costs for delivering the information.

2.4 Component 3: Data for themes of the INSPIRE annexes

2.4.1 Scale and resolution: European, National, Regional, Local, Other

The data in the NSDI includes what is termed core reference and thematic data. Digital data at the national level is in most cases provided at the scale of 1:10.000 and stored in the national land-use and topographic database. Generalised products are available.

Larger scale data also exists at the local level, but this has not been harmonized for national purposes.

2.4.2 Data by resolution or scale range for the INSPIRE themes

The Geographical Sweden Data (GSD) offers access to maps in different scales. The following is an overview of the product descriptions available on-line. Visitors view the description information (presented in PDF format) and can order the product (either vector or raster maps) from the specified contact person. (http://www.lantmateriet.se/cms/level2index.asp?produktgrupp=104A)
<table>
<thead>
<tr>
<th>Scale</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:10 000</td>
<td>The Property Map series (Fastighetskarten)</td>
</tr>
<tr>
<td></td>
<td>The main elements are:</td>
</tr>
<tr>
<td></td>
<td>- Orthophoto</td>
</tr>
<tr>
<td></td>
<td>- Boundaries, including property boundaries</td>
</tr>
<tr>
<td></td>
<td>- Names and register numbers of property units</td>
</tr>
<tr>
<td></td>
<td>- Place names</td>
</tr>
<tr>
<td></td>
<td>- Line enhanced planimetric details</td>
</tr>
<tr>
<td></td>
<td>- Arable land</td>
</tr>
<tr>
<td></td>
<td>- Contours with a 5-m interval</td>
</tr>
<tr>
<td></td>
<td>- The national grid</td>
</tr>
<tr>
<td>1:50 000</td>
<td>Topographic Map (Topografiska kartan)</td>
</tr>
<tr>
<td></td>
<td>The Topographic map series give detailed information about land use (forest clear-cuts, boulder-stewn areas and rock outcrops, etc) and about all kinds of roads and foot-paths.</td>
</tr>
<tr>
<td>1:100 000</td>
<td>Road Map (Vägkarten)</td>
</tr>
<tr>
<td></td>
<td>The Road map is based on the Topographic Map series and is designed to be used as a detailed and up-to-date road map.</td>
</tr>
<tr>
<td>1:50 000</td>
<td>The Mountain Area Map (Fjällkarten)</td>
</tr>
<tr>
<td>1:100 000</td>
<td>The maps have been adapted to cater for mountain hikers with more detailed information about trails, shelters, etc.</td>
</tr>
<tr>
<td>1:250 000</td>
<td>General map + general description; General road networks; General administrative boundaries</td>
</tr>
<tr>
<td>Other</td>
<td>Maps of Sweden: 1:1 000 000</td>
</tr>
<tr>
<td></td>
<td>Generalised versions of Sweden including administrative boundaries 1:5 – 1:20 mil.</td>
</tr>
<tr>
<td></td>
<td>Terrain Elevation database + general description</td>
</tr>
<tr>
<td></td>
<td>Contours at 5m, 10m, and 25m vertical intervals</td>
</tr>
<tr>
<td></td>
<td>Digital orthophotos</td>
</tr>
<tr>
<td></td>
<td>Land Cover Data (Corine Land Cover + Swedish more detailed land cover database)</td>
</tr>
<tr>
<td></td>
<td>The National Road Database which is established in close cooperation between the Swedish Road Administration – as coordinator – Lantmäteriet, the municipalities and the forestry companies.</td>
</tr>
</tbody>
</table>

The principle sources of reference data in the Swedish NSDI (NLS) are elaborated as: (Wiberg, ETeMII):

- The **geodetic reference system** (ETRS89 adjustment) is well established and used. Permanent GPS beacons provided differential GPS service. The system is adjusted to the common European and Global Reference System;
**Administration units** are well established in the Real Property Register and in the system with basic geographic information. From here it is possible to generate most kinds of administrative units out of the system;

**Property rights units** provide the strongest part in the NSDI when taken together with the Real Property Register and the Cadastral Index Map;

**Addresses** (held by the post office and municipalities) are handled in a way that all known requirements of the NSDI can be satisfied;

Selected **topographic themes** include elevation models established for the entire country, transportation networks which are well established with the Swedish National Road Database (SNRD); Hydrography is established in the system for basic geographic information, and is planned for further expansion and elaboration of the data set; Orthoimagry is well established and the Orthophotos cover the whole country (being updated each year for 25% of the Country surface area).

The LDBS is comprised of the Real Property Register together with the Land Register. On its own, the LDBS is “text only” information but in combination with the cadastral index map the database becomes geographically referenced.

The current version of the Real Property Register was introduced to Sweden in 2000 gives the following detailed information (Wiberg):

1. **Real Property**:
   - Property unit
   - Joint property unit
   - Coordinates
   - Plans, regulations and rights
   - Precincts
   - Joint facility
   - Cadastral index map

2. **Land Register**:
   - Title
   - Leasehold

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*Each property unit in Sweden is described with the following information: Administrative area where the property unit is located; Address; Location on the cadastral index map; Centroid coordinates from the property unit and the buildings on it; Area of the real property unit, and tax assessment values; Name, address and civic registration number of the owner; Date for purchase, changes and price information; Building plans and regulations affecting the unit. (ETeMII, also Wiberg).*
- Mortgage
- Rights
- Notifications

3. Building:
   - Building unit
   - Address
   - Coordinate

4. Address:
   - Address unit
   - Property unit

5. Property Tax Assessment:
   - Total assessed value
   - Assessed value for land
   - Assessed value for buildings
   - Basis for valuation
   - Owner

Other data existing includes that which is held by various government agencies who maintain data for environmental, agricultural, geological, transportation, statistical, etc. purposes.

**2.4.3 Geodetic reference systems and projections**

SWEREF 99 is a Swedish realization of ETRS 89. SWEREF 99 coincides with WGS 84[G873]. Coordinates can be transformed from SWEREF 99 to the Swedish coordinate system RT90 via a seven parameter transformation formula: [http://www.lantmateriet.se/cms/level2index.asp?produktgrupp=104C](http://www.lantmateriet.se/cms/level2index.asp?produktgrupp=104C). Lantmäteriet will introduce SWEREF 99 in the beginning of 2007, and add geoid to get more accurate information on elevation for surveying purposes.

The ellipsoid used with SWEREF 99 is GRS 80.

The national map coordinate system is RT90. It is a local geodetic datum. The Swedish national map series are based on a Transverse Mercator (Gauss-Kruger) grid of this datum, and is denoted: RT 90 2.5 gon V 0:-15

Older maps are based on RT 38 which differs from RT 90 with 0-5 metres.
The ellipsoid used with RT 90 is Bessel 1841.

The processing of GPS data is performed according to EUREF guidelines and based on observations made on permanent reference stations in Sweden (SWEPOS), Denmark, Finland (FinRef), and Norway (SATREF).

The national height system in Sweden is RH 70, the National Height System 1970. The system is connected to the NAP (National Amsterdam Peil) via UELN 55 (United European Levelling Network 1955).

Projection zones: for larger scale maps >1:10 000, there are 6 different zones of Transvers Mercator projections used in Sweden. Six are used to reduce the map projection errors. The boundaries of the projection zones are adjusted to follow administrative borders if possible.

The SWEN 01L is the national geoid model provided by the NLS and replaces the previous SWEN98L model. SWEN01L is based on a Nordic geoid model called NKG 96, which is in turn based on the global geoid model EGM98.

### 2.4.4 Quality of the data

It is recognized that the most essential objective for the NSDI is to deliver information that can fulfill the demands from users in the whole society. An evaluation of SDI users and their use of the information is carried out in an annual survey. The results of the survey are used as the base for programs and for improving activities.

One Internet- and service based project that was recorded as a failure was “SwedeFacts”, which attempted to bring together on-line maps, statistics and real estate data. But the system was an economic failure and was discontinued in 2000. Reasons for the failure include: the wrong products were being offered, thus not meeting the users’ needs; prices were too high, the value of maps had been over estimated; too high costs to develop and maintain and market the system (SCB, 2000).

During the last years, much effort has been spent on establishing efficient routines for updating (NLS) information directly from the source. Examples include (1) the National Road Administration, delivering information on new or changed public roads, (2) the municipalities delivering information on local streets and(3) the National Environmental Protection Boards, delivering information on national parks.

### 2.4.5 Interoperability

The NSDI is based on cooperation between the different bodies and a commitment to use standards (see section 2.6). Particularly in Sweden where the Municipalities are strong and have an independent status, voluntary cooperation is essential (Wiberg).
2.4.6 Language and culture

Metadata is provided in Swedish and in some cases, but not all, English. Accompanying documents for the data and maps are provided. Several of the existing standards, e.g. on road and railway network and hydrology, as well as existing database specifications are today also available in English.

2.4.7 Data Content

No information has been found.

2.4.8 Geographical names

The GSD PlaceNames dataset has approximately 450,000 place names. It remains to be determined the number of languages that the names are provided in.

2.5 Component 4: Metadata

2.5.1 Availability

The metadata situation for datasets identified via the NSDI is not always complete or up-to-date. Many datasets do have metadata. On-line this is usually metadata of the Exploration or Discovery type. Exploitation metadata was not observed on-line and may be explicitly delivered with orders for data.

In the Swedish SDI, metadata exist but they are not structured according to standards yet. However, LM is working on standardization. The Elips program aims at standardizing descriptions, and a working group on metadata was installed by the GI Advisory Board in the process towards the first version of the National GI strategy. So far, the working group has looked at discovery level metadata only, at the level of datasets. The object level will be addressed later on. The implementation of metadata standards will begin at the internal level of LM. Afterwards, the national level will be shaped accordingly.

The focus lies on ISO 19115. The working group has selected 22 elements to use as core metadata and will add a limited number of other elements. A Swedish translation of the ISO standards is being made by technical committee 489 of the Swedish Standards Institute. The committee has members of LM, the Road Administration, the Association of Municipalities, the Geological Survey, the Housing Board, private companies and the municipality of Stockholm. The intention is to produce Swedish translations for all 400 elements, which can be used by all authorities.

2.5.2 Metadata catalogues availability + standard

There are different metadata catalogues available on-line either directly on the NLS pages or on the web sites of key players (e.g. http://www.lantmateriet.se/cms/level2index.asp?produktgrupp=104A)
Within the Stanli project a standardization project concerning metadata has recently started. The aim is not to develop a new standard, but to set up implementing rules for the existing ISO 19115 standard and to make necessary adjustments to meet specific Swedish needs.

Lantmäteriet also take part in the establishment of EuroMapFinder – a service being set up by EuroGeographics.

A GeoLex service exists for metadata for the Swedish reference database (available via the NLS web site), and is based on national standards (GINIE).

A separate service (MEGI) exists for metadata on thematic data. The MEGI, or metadata for geographic information is a web based service following the standard CEN 12657. The MEGI tends to be out of date in regards to the metadata content.

Metadata catalogues are also distributed on CD-ROM.

### 2.5.3 Dublin core metadata standards for GI-discovery

### 2.5.4 Metadata implementation

FIR

### 2.6 Component 5: Network Services

#### 2.6.1 On-line access service for metadata: discovery services

A service called ‘GeoLex’ exists for metadata for Swedish reference data (http://www.geolex.lm.se).

A service for metadata on thematic data ‘Megi’ is also provided by Lantmäteriet. There is today no plan for updating of the service.

There are also discovery services for reference data (e.g. MapSearch and Geographical Data Sweden) on the Lantmäteriet website.

A comprehensive service for on-line access to metadata on data on the national and local level is part of the National GI strategy.

#### 2.6.2 On-line access service for data: download services

Statistics Sweden is also contributing to the collection of Internet databases freely available for users. The Internet databases have statistical data on the country, county and commune levels. The data can be used in conjunction with the Internet map server “SCB Maps”. (SCB, 2000)
Internet is not the only way that data is disseminated, as access and geoprocessing services for reference and thematic data come mainly through CDROM rather than the Internet.

### 2.6.3 Inter-linkages of on-line access services for metadata and data

No information has been found.

### 2.6.4 Open Source software

No information has been found.

### 2.6.5 Availability of viewing services

Web mapping services are commonly available on many web pages in Sweden. An example is the MapSearch service at the NLS-website: [http://www2.lantmateriet.se/ksos_eng/index.html](http://www2.lantmateriet.se/ksos_eng/index.html).

In most cases, only viewing services are offered, but no download services.

### 2.6.6 Availability of catalogue services that perform payment operations

The services allow the user to order on-line maps. In most cases billing will follow with the map delivery – either via the Internet (e-mail) or in the normal post.

### 2.6.7 Availability of catalogue services to extract and send data to a user application

No information has been found.

### 2.6.8 SDI user applications

Customised databases and maps offer a range of products and services via the NSDI (NLS).

The MakeAPoint application is a geocoding service that lets the user get map coordinates for specific objects (e.g. office locations, customers, etc). It is a system in which the client’s own specific data can be integrated with geographic data from the NLS over the Internet. Once the coordinates are assigned the mapping is possible. MakeAPoint lets the user retrieve map coordinates in a logical way. InstantMap is a separate service that lets the user combine standard background maps and other official data with their own data (e.g. customer related data). Both services are available via the NSDI. Other customized services include: Landscape models, MapSupport and Rescue services, MapSupport Taxi, Sverige 1000 Professionell, Tactile maps.
Relatively new Internet solutions available via the NSDI to the general public include (NLS, 2001):

- Property Search for all. In this service there is information about the area, the latest prices and tax assessed values for individual dwellings and the second homes. The system can be queried and the answer will include an overview map of the relevant property unit. The information is taken directly form the Real Property Register. A search on this database costs SEK 30 (about EURO). This site has about 10-12,000 visitors per month.

- New version of the Real Property Barometer. The combination of the Real Property Barometer and the Property Search for all is an effective tool for following the developments of the housing market.

- Historical Maps offers a large amount of information. It is possible to search through 2,000 old maps and documents: town maps, topographic map series, Economic map series. The maps can be made available via Internet or on CD-Rom. The NLS plans to make progressively more of the archives available through this service. This site has about 20,000 visitors per month.

- YourMap service provides customized maps on the Internet. The visitor can chose a map size and center point of their choice (e.g. a house or any point of interest) and then place an order for only the relevant part of the General Map, the Road Map, the Topographic Map and the Cadastral Index Map. The maps are delivered (as images) either by e-mail or as CD-Roms delivered by the post. Monthly visits to the site range from 35-45,000 persons.

- The “Ask Surveyor” service provides users with the possibility to ask questions about a particular piece of land, by drawing on a map.

2.6.9 Availability of geo-processing services

Geo processing services are well supported at the National level, but are not part of the SDI infrastructure yet.

2.7 Standards

Regarding the implementation of standards, the Swedish Standards Institute (SIS) is responsible for the development of national standards and encourages following global trends, namely ISO/TC 211 and CEN/TC 287. SIS vision is to be the most effective organisation for Swedish companies, authorities and organisations, where the knowledge of and the gaining of access to standards are concerned, along with the possibility to influence and take part in the work on national, European and global standards.

The Swedish Standards (SS) series concerning roads, addresses and other layers of GI are well developed. The standards are established for data produced by cooperation between different organizations (GINIE).
Standards in use in the NSDI include:

- GGD-specification – used for mapping and elevation (height) models;
- Swedish Standard SS 63 70 03 – used for addresses
- Swedish Standard SS 63 70 04 – used for description of road and railroad networks
- Swedish Standards for utility networks
- Swedish Standard for surface water systems networks

Work is also going on concerning standardization of:

a. Hydrology (lakes, rivers, catchments etc), SS 63 70 08
b. Cadastral parcels
c. Building plans
d. Metadata
e. Road feature catalogue

### 2.8 Component 6: Thematic environmental data

#### 2.8.1 Introduction

The NLS will report the result of a governmental assignment about possible national consequences of INSPIRE at the latest by 1st of September 2005. The report will deal with organizational issues and include an overview of responsibility among Swedish authorities for the different themes specified in the draft framework INSPIRE proposal for a Directive (annex 1-3). The Swedish Environmental Protection Agency (SEPA) is one of the authorities responsible for environmental data at national level. At regional level the County Administrative Boards are important SDI drivers.

Below you find a description of the organizational structure chosen by SEPA for handling environmental data.

[NLS] SEPA has chosen a model with data custodians responsible for storing environmental data with regard to pressure and state. Most data is not in GIS-format but information about geographical position is available. There is an ongoing development work in making this data and information accessible through GIS applications. The fundamental strategy is that data should be stored close to where it was generated (i.e.

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4 The report can be used as reference material for next version of this State of Play Study.
close to the producer). Different quality parameters, for example knowledge of how the values have been calculated and what they stand for is available here.

The data custodians are responsible for storage and distribution of quality-assured environmental monitoring data (basic data). A data custodian is to receive and keep data from a specific subject area accessible. The data custodian is also responsible for certain feasibility studies and quality-assurance checks and be responsible for the distribution of basic data in accordance with an agreed plan.

For an overview of national data custodians – monitoring data - visit: http://www.naturvardsverket.se/dokument/mo/modok/datavard.htm (only in Swedish)

Lantmäteriet will at the request of the SEPA help the Agency to build a stable infrastructure for geographic information (the structure of geographic data at servers, applications to facilitate availability to geographic data and the connection between attribute data and the geographic map layers). Main focus in this project is the process of nature conservation (including Natura 2000) together with the County Administrative Boards. The information will also be available to citizens on the Internet. This project (VIC Nature) is in progress.

At regional level the county administrative boards have made efforts to establish a SDI built on a common network (an intranet called lst-Net). The aim of the GIS service (lst-GIS) in this network is to make access to common databases and also make data and information available to the public on Internet. The Swedish County Administrations GIS-portal (www.gis.lst.se) is maintained by the County Administration West Sweden. It contains:

- Various ESRI ArcIMS-based public (and in some instances password-protected) national and regional GeoServices. These are developed, hosted and maintained by the IT-section at County Administration West Sweden on assignment from 21 County Administration and some other national agencies. The most recent GeoService is concerned with the EU Water Directive: http://www.gis.lst.se/vattenkarten

- Catalogue service - data upload/download, search, metadata display and map preview interface. Contain some 1500 GIS-related datasets produced by the Swedish County Administrations and uploaded as shape-files. Of these, some 30 datasets are, or in process of being, ‘harmonised’. These datasets are continuously merged to national datasets. Most of these datasets are related to environmental issues and are legislative/protected areas. http://www.gis.lst.se/lstgis/

- Links to a few initial ArcIMS MapServices / OGC WMS.

These datasets are not harmonised according to INSPIRE, but:

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5 Currently only in Swedish
6 Due to that certain data, such as cadastre and demography, has restrictions set by the data providing agency.
- Have the same file-name for each 21 county administration

- Use the same set of attribute fields as specified by the ‘standard’ from The National Board of Housing, Building and Planning as well as internal County Administration workgroups. Implementation of automatic upload of ArcCatalog (or other) XML-files using ISO 19115 (or similar) is in process.

- ArcSDE is used in the GeoServices to store nationwide background data from the National Land Survey (topographic maps 1:1 million down to 1:10.000), Swedish Maritime Administration (sea-charts) and other base data providers. Contains approx. 600 GB. Storage of harmonised data in ArcSDE are being discussed.

Also displayed on the portal is an experimental **OGC WMS**, which could be reached at [http://gis.lst.se/ogcwms_lst_sverige/servlet/com.esri.ogc.wms.WMSServlet](http://gis.lst.se/ogcwms_lst_sverige/servlet/com.esri.ogc.wms.WMSServlet) (which uses the underlying ArcIMS9 MapService “ms_lst_sverige”, which can be seen at [www.gis.lst.se](http://www.gis.lst.se) in ArcMap for example). Further tests needs to be done.

The WMS contains 13 of the harmonised datasets mentioned above. Data are stored in original RT90 (EPSG:2400).

Portal development & catalog harvesting:

The County Administrative Boards are evaluating ESRI’s GeoPortalToolkit version2 as a possible future portal platform.

They will also investigate the possibility to adopt to some protocol so that our catalogue service can be “harvested” (metadata can be seen) by other portals. This has been discussed briefly as a test case with the geoportal team at **JRC, Ispra**.

An English GeoService could also be provided.

### 2.8.2 Application of the legal framework and funding principles to thematic environmental data

[NLS] SEPA and the county administrative boards are the copyright owners for the basic data, with regard to pressure and state, produced by the data custodians. When it comes to charging, these data are free for everyone at marginal costs. Data can be ordered by anyone from the data custodians.

Information about threatened species (nesting areas) can be classified as confidential. In cooperation with the Statistics Sweden, especially in regard to presentation of sources for discharges to and pollution load on waters, it is important to be aware of their special rules concerning secrecy (The Secrecy Act).

SEPA is authorized to develop regulation towards the County Administrative Boards as a step in the implementation of the Water Framework Directive. Harmonizing the treatment
of GIS data is one of the areas SEPA has chosen to regulate, e.g. the reporting formats to the European Commission.

2.8.3 Application of metadata issues identified for to thematic environmental data

http://www.artdata.slu.se/home.htm

2.8.4 Application of access services issues to thematic environmental data

2.8.4.1 Environmental objectives

[NLS] Information about the Swedish environmental objectives can be reached at the following Web Portal http://www.miljomal.nu/english/english.php This Portal include information about indicators and their underlying datasets. The indicators will be used as tools in assessing progress towards the objectives.

2.8.4.2 Water

The Geological Survey of Sweden, The National Board of Housing, Building and Planning and the SEPA are responsible for a Water Web Portal. http://www.vattenportalen.se/. The portal is the result of one of many activities in implementing the water framework directive. The first version of this portal comprises general information but there are ideas of developing metadata and data distribution services and GIS applications in the future.

The Swedish Surface Water Data Base is managed, maintained and further developed by the Swedish Meteorological and Hydrological Institute (SMHI). The surface water database includes information on watercourses, drainage basins and lakes in Sweden, as well as on the surrounding coastal waters and sea areas. Information and data can be reached via SMHI:s website http://www.smhi.se/en/index.htm.

The Geological Survey of Sweden (SGU) is national data custodian for monitoring data (groundwater). SGU has developed a GIS application for presentation of SOE data: http://maps.sgu.se/squinternetmaps/miljoovervakning/default.htm

2.8.4.3 Pressure

The SEPA has investigated how information about the use and release of chemical substances can be made available to the public. As a result of this study Sweden has developed a Pollutant Release and Transfer Register (PRTR) containing information on emissions and discharges of chemical substances and groups of chemical substances from large point sources. The Aarhus Convention, adopted in 1998, supports a protocol on Pollutant Release and Emission Registers that was signed at the ministerial meeting in Kiev in May 2003. The Swedish PRTR was released in may 2003 and will in the future be
updated with a geographical interface for the public where they can localise major pollutant sources near their home or workplace. The PRTR can be reached from The SEPA’s website, http://www.naturvardsverket.se/prtr/

Two Internet applications can statute examples of how environmental data and information about state and pressure can be presented and downloaded on Internet:

- A system for nitrogen (N) and phosphorus (P) gross and net load calculations, retention and source apportionment have been developed and applied for reporting to HELCOM, PLC-4. GIS is part of this model. The data custodian has made the reporting results available on http://www-nrciws.slu.se/TRK/index.html

- The MATCH model application (view and download deposition data from SMHI, a national data custodian): http://smed.smhi.se/website2/MATCH_mo_swtdno/main.htm

2.8.4.4 Threatened species

The Swedish Species Information Centre works with knowledge about biodiversity in Sweden. The main tasks are to collect, evaluate and store the most important information about threatened and rare plant and animal species. A basic part in this work is to assess degrees and types of threat and to prepare the national so called Red Lists and Red Data Books. For more information visit: http://www.artdata.slu.se/home.htm

An example of an Internet reporting application of species (state of environment data) can be reached from the link below. This application also include presentation of data in real time presented.

http://www.artportalen.se (Also in English)

2.8.4.5 Geology

The Geological Survey of Sweden (SGU) holds multiple datasets such as: geo-register, bedrock, the geology for surface deposits, hydrogeology, geophysics, geochemical, mineral supply, and a bedrock database. SGU is connected to the NSDI. The SGU web site includes database definitions and description (Discovery information). For more information visit http://www.sgu.se/sgu/en/index.html (You find information about databases and map services under Services).

2.8.4.6 Environmental information in real property register and cadastre

In Sweden there is a move to introduce an environmental part in the Real Property Register with information on judicial decisions in the environmental courts and restrictions decided by other public bodies and as a result from different inventories. (SLFb, 2001)
The NLS has presented a proposal on how to include environmental information to the cadastre (NLS, 2001).

2.8.4.7 VIC Natur

NLS and SEPA have made an agreement including two different parts:
- one with the purpose to make the collaboration more efficient within the field of environment area protection between NLS, SEPA and the County Administrative Boards by building a stable infrastructure (the structure of geographic data at servers, applications to facilitate availability to geographic data and the connection between attribute data and the geographic map layers).
- The other part includes GIS support from NLS to SEPA. The support includes for example GIS analysis and a data warehouse for geographic information needed at SEPA. GIS data produced by SEPA is included.

There are plans to make information in VIC Nature available to the public via the Internet.

2.8.4.8 WISS – Water Information System in Sweden

WISS is the Swedish counterpart to WISE (Water Information System for Europe). The purpose is to collect all kinds of information needed about the water bodies and monitoring stations in one place – and make it available to all stakeholders and the general public. All information about classifications, measures, monitoring, trends and more is available in one place based on several different data sources. Where possible all information is currently integrated through links and in the future through web services. The database contains a reference library where you can download documents.

For each monitoring station and water body there is a simple map showing the location and a link to the more comprehensive Water Map (www.gis.lst.se/vattenkarten) which is an Internet Map Server which is also available as a web map service in your desktop GIS program.

The editing of the database is possible from everywhere with an Internet connection and there are GIS tools to group and work with WISS in a work flow. All changes are recorded and it is also possible to get in touch with each editor through an e-mail link available for each amendment.

The development of the database started in 2005 and is in operation since November 2006. During 2007 all water bodies should be classified according to the Water Framework Directive.

2.8.5 Application of standards issues to thematic environmental data

Within SIS (the Swedish Standards Institute) a project called Stanli promotes standardization within geographic information. In 2006, a new standard has been adopted, Geographic information – Surface Water Systems – Conceptual and Application Schema (SS 63 70 08). The standard is a result of cooperation between nine authorities and organizations in Sweden representing national, regional and local level. SIS will send
this standard as a reference document to the INSPIRE Data Specifications Drafting Team.

The County Administration Boards are in progress of developing a common metadata specification based on ISO 19115. This specification is a mix of metadata of the exploration, exploitation and discovery type.

For more information about SIS (Swedish Standards Institute) please visit http://www.sis.se/DesktopFront.aspx . Contact person Torbjörn Cederholm, The Swedish standardisation programme in Geographic Information (Stanli) torbjorn.cederholm@sis.se.

2.9 Use and efficiency of SDI

Discussion about cadastre is relevant to the understanding of the evolution of SDI in Sweden. Public Sector Information (PSI) has been set high on the government’s policy agenda. PSI is seen as a key resource for the development of the Swedish society, and the Swedish Land Information System (LIS) is considered to be an important component in the Swedish Information Infrastructure. The LIS has been fully integrated into other government systems for public information, and is updated on a daily basis from registrations held at the source (SLF 2001a and SLF 2001b).

The Swedish cadastral system consists of the Land Law, the Real Property Formation Act, the Real Property Register Law and Ordinance, the Measuring Code, the Cadastral Survey Process, and the Real Property Register, which is including the Land Register. The cadastral system and the associated databases are an essential part of the NSDI (SLF, 2001a).

Organisationally, the Swedish cadastral system is decentralized. There are some 90 local and regional agencies in the country. It is a service oriented agency, and through the Internet anyone can get information about the organization and access to application forms.

The use of the LIS databases and in fact the NSDI has become very wide spread throughout Sweden. The business sector has become very attracted to using the LIS (and thus the NSDI) services. Presently (spring 2003) the LIS Internet site is getting upwards of 200,000 visits per month. The LIS is charging fees for different services provided, and the business sector, which is the biggest user, accounts for about 70% of all user fees paid to the LIS.

The NSDI is in effect bringing about change in the business and the government sectors. Benefits from using the LIS have been specified and include: shorter times to handle transactions; spin-off effect in businesses that have developed new more effective

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7 The NLS is responsible for the LIS. A new steering document “VVV 2006” presents the vision of the NLS and the strategy and management systems for quality assurance issues.

8 Note: even though the Swedish cadastral organisation has a policy to be widely accessible via the Internet, the organisation actually prefers to have direct contact with the applicants. See ref.: SLF 2001a, page 3.
systems and processes; new possibilities for more Internet based services as a result of
the increased competition in the business sector; more effective processes from the
administration (SLF, 2001b).

The use of standards will also bring about change. It is expected that the use of standards
in the NSDI, especially ISO/TC 211 compatible, will have a positive impact, and the GI
market is expected to continue to expand in Sweden. Other drivers for Sweden’s push to
provide the NSDI include municipal obligations for Master Plans. The planning process
requires a large amount of information and thus many municipalities want to use GIS.
Most municipalities that have revised their master plans recently have used some form of
digital maps. Real property and geographic information is being used in the planning
process (NLS, 1997).

Measuring market share is one way to identify or estimate user satisfaction in a service.
If the measure is how many actors in the business sector are using the NSDI then in
Sweden the following can be noted. Almost every bank office and real estate broker has
access to the NSDI. Today, the information available via the NSDI is being used in every
real property transfer and mortgage (Wiberg).
## 3 Annexes

### 3.1 List of SDI addresses / contacts for Sweden

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Web address</th>
<th>Organisation mailing address</th>
<th>Over-all contact person: tel./fax/e-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>National</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLS</td>
<td><a href="http://www.lantmateriet.se/index_eng.htm">http://www.lantmateriet.se/index_eng.htm</a></td>
<td>Lantmäteriet SE-801 82 Gävle Sweden</td>
<td>Director General Stig Jönsson E-mail: <a href="mailto:stig.jonsson@lm.se">stig.jonsson@lm.se</a> International coordinator Ulf Sandgren E-mail: <a href="mailto:ulf.sandgren@lm.se">ulf.sandgren@lm.se</a> Tel.: +46 26 63 30 00 Fax: +46 26 68 75 94</td>
</tr>
<tr>
<td>Formas, the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning</td>
<td><a href="http://www.formas.se/">http://www.formas.se/</a></td>
<td>Formas Box 1206 Birger Jarls torg 5 111 82 Stockholm</td>
<td>tel: 08 775 40 00 fax: 08 775 40 10 <a href="mailto:info@formas.se">info@formas.se</a></td>
</tr>
<tr>
<td>ULI, the Swedish Development Council for Land Information</td>
<td><a href="http://www.uli.se/">http://www.uli.se/</a></td>
<td>ULI - Swedish Development Council for Land Information SE-801 82 Gävle</td>
<td>President, Lars Lindqvist Secretary General, Ewa Rannestig Information officer, Lisa Samuelsson Tel.: +46 (0)26 61 10 50 Fax :: +46 (0)26 61 32 77 E-mail: <a href="mailto:uli@uli.se">uli@uli.se</a> <a href="http://www.uli.se">http://www.uli.se</a></td>
</tr>
<tr>
<td>SIS, Swedish Standards Institute</td>
<td><a href="http://www.sis.se/standli">http://www.sis.se/standli</a></td>
<td>SIS, Standli SE- 118 80 Stockholm</td>
<td>Torbjörn Cederholm Tel. +46 (0)8 555 520 00 e-mail: <a href="mailto:standli@sis.se">standli@sis.se</a></td>
</tr>
</tbody>
</table>
### 3.2 List of references for Sweden

Table: list of references used to compile the Country Report

<table>
<thead>
<tr>
<th>Web sites:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lantmäteriet (National Land Survey, NLS)</td>
<td><a href="http://www.lantmateriet.se/">http://www.lantmateriet.se/</a></td>
</tr>
<tr>
<td>Stads Kartan</td>
<td><a href="http://www.stadskartan.se/start/">http://www.stadskartan.se/start/</a></td>
</tr>
<tr>
<td>Kartplan 2002</td>
<td><a href="http://www.lm.se/kartplan/">http://www.lm.se/kartplan/</a></td>
</tr>
<tr>
<td>GeoLex – web mapping application</td>
<td><a href="http://www.geolex.lm.se/">http://www.geolex.lm.se/</a></td>
</tr>
<tr>
<td>MEGI: Metadata för geografisk information</td>
<td><a href="http://www.megi.lm.se/">http://www.megi.lm.se/</a></td>
</tr>
<tr>
<td>ULI, the Swedish Development Council for Land Information</td>
<td><a href="http://www.uli.se/">http://www.uli.se/</a></td>
</tr>
<tr>
<td>Databases in the Swedish Museum of Natural History</td>
<td><a href="http://www.nrm.se/databas.html.en">http://www.nrm.se/databas.html.en</a></td>
</tr>
<tr>
<td>UN convention on biological diversity (CBD) here is information about CBD, diversity status in Sweden and the activities of Swedish authorities and organizations</td>
<td><a href="http://www.svenskamiljonatet.se/cbd/eng/">http://www.svenskamiljonatet.se/cbd/eng/</a></td>
</tr>
<tr>
<td>The Geological Survey of Sweden, SGU</td>
<td><a href="http://www.sgu.se/index_e.htm">http://www.sgu.se/index_e.htm</a></td>
</tr>
<tr>
<td>Legal and funding references</td>
<td><a href="http://www.spatial.maine.edu/~onsrud/gsdi/Sweden.html">http://www.spatial.maine.edu/~onsrud/gsdi/Sweden.html</a></td>
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<td><a href="http://home.online.no/~wkeim/foil.htm">http://home.online.no/~wkeim/foil.htm</a></td>
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<td>Publications:</td>
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<td>------------------------------------------------</td>
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<tr>
<td>Clark, Mike (2002). Briefing notes to the INSPIRE DPLI Working Group, Appendix A – EU Member States (brief1.doc).</td>
<td></td>
</tr>
</tbody>
</table>


**Other sources:**

Written contributions on draft versions of the Country Report as provided by the Swedish National Land Survey and the Swedish Environmental Protection Agency.