

Nature-SDI^{plus}: Nature Conservation Data through User's Eyes

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Abstract

When it comes to nature conservation activities, landscape planning, and protected area management (spatial) data, metadata, and according tools are almost indispensable today. In order to use, share, and reuse nature conservation data, metadata, and tools, these three components must comply with many requirements defined by the users. The interdependent elements (data, metadata, tools, and users) are described by the term *Spatial Information Infrastructure*. In Europe a nature conservation SDI is implemented by the EU-project Nature-SDI^{plus} following the INSPIRE Directive. Its realisation is based upon the understanding of European users of nature conservation data, gained by a specific online questionnaire. Due to their special conditions (e.g. management authorities and infrastructure, management objective *research*) large protected areas are ideally suited to exemplify best practice for Nature-SDI^{plus} considering in particular the requirements of data users.

Keywords

SDI, data, metadata, tools, user, nature conservation

1. SDI for Nature Conservation

Today, nature conservation is as an integrative part of human activities. For almost all relevant tasks like planning, management, monitoring, evaluating, and reporting spatial data is essential. Besides, being existent, available, and accessible, data must be interoperable, harmonised, standardised, and *cross-border*¹¹ etc. In Europe data use is currently hindered by e.g. incomplete and inconsistent data availability, difficult, or missing data access, data fragmentation, different geographical scales of data, and duplication of data collection (URL 1). To comply with these deficits, at national and at EU level awareness is growing on the need for a European Spatial Information Infrastructure (SDI). Thereby, SDI is defined as a framework of spatial data, metadata, users, and tools (= applications & services) for e.g. geoprocessing, viewing, connecting and downloading of maps and data (see Fig. 1).

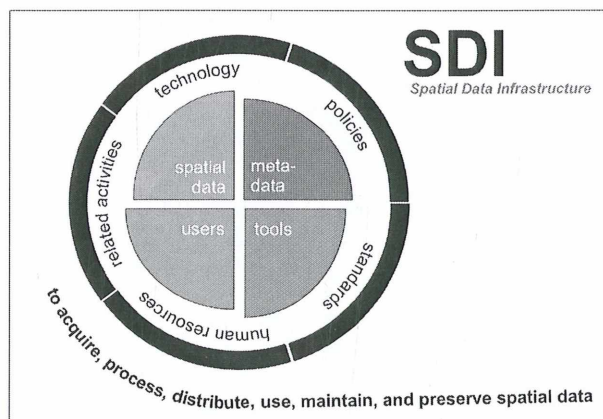


Figure 1: Definition of SDI Spatial Data Infrastructure

For the creation of a European SDI the INSPIRE¹² Directive is the relevant initiative. It embraces 34 different themes. Nature conservation related themes are protected sites, biogeographical regions, habitats and biotopes, and species distribution (URL 1). For nature conservation the eContent+ project Nature-SDI^{plus} (see Tab. 1) supports the implementation of the INSPIRE Directive.

¹¹ Borders exist not only between different countries, they can be found e.g. at local, regional and national level as well as between protected areas and their surroundings. Further, borders exist, when a significant change in one or many land attributes occur.

¹² Infrastructure for Spatial Information in Europe

Table 1: Information on the EU-project Nature-SDIplus

Project Management	GISIG, Italy
Term	10/2008 to 03/2011
Partners	30 partners in 17 EU countries
Budget	2,7 Mio €
Internet source	http://www.nature-sdi.eu
Context	INSPIRE Directive (http://inspire.jrc.ec.europa.eu)

Large protected areas are of special significance in the realisation of Nature-SDIplus: *Protected sites* are not only explicitly listed in the INSPIRE Directive (see URL 2), and are one main focus of Nature-SDIplus, but they are also an important instrument of nature conservation – particularly considering *Natura 2000* in Europe. Due to the existence of management authorities, management tasks, and management infrastructure (e.g. availability and use of data, metadata, GIS) as well as the management objective *research* (including research on management questions) large protected areas show ideal conditions for prototyping and best practice examples for implementing SDI components (data, metadata, services). Thus, they are currently in the process of opening their huge collections of (spatial) data from in-house desktop-GIS solutions to SDIs. In doing so the actual situation and the manifold requirements of the different data users have to be considered to meet the above mentioned deficits concerning the provision of accessible and harmonised spatial data according to the INSPIRE Directive (URL 3). Here the crucial question is how the situation of users and use of European nature conservation data is? Within this paper a rough overview on some selected aspects will be presented which is based on an online survey realised within the Nature-SDIplus project. For large protected areas this gives an insight what a SDI on nature conservation should comprise before tackling the technical realisation.

2. Getting information on data users

Planning the implementation of a SDI with its components data, metadata, and tools builds upon the field of software engineering¹³. Focusing on the demand of user-centeredness, usability is crucial (see Fig. 2). In consequence, usability engineering as part of software engineering must be applied (NIELSON 1993; RICHTER & FLÜCKIGER 2007). Information on usability aspects is gained through a *survey* on data users and their requirements. The survey is developed as an online questionnaire with 67 questions by the online survey tool *Survey Monkey* (URL 4). The questionnaire builds on (see Fig. 2):

- the state of the art of empirical social research (see NEUMANN 2006),
- the characterisation of the SDI components, and
- the understanding of nature conservation and its tasks.

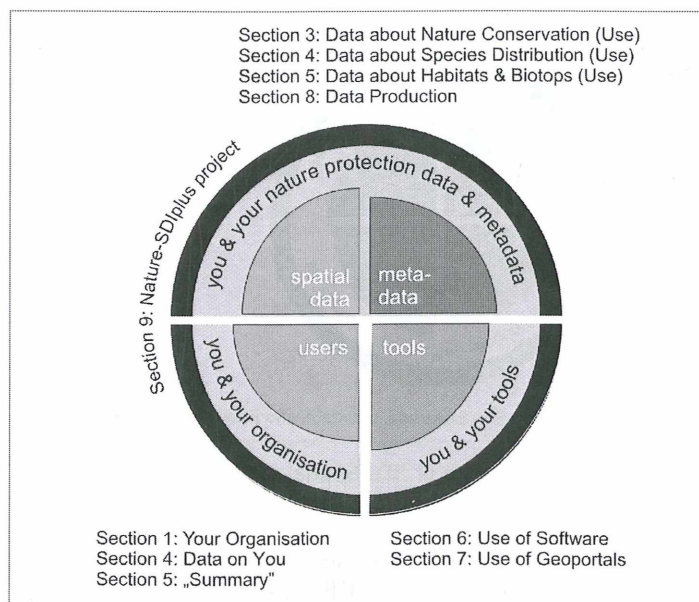


Figure 2: Nature-SDIplus user questionnaire: content & structure

¹³ By definition software engineering is the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software, and the study of these approaches (Rossi et al. 1008)

The interviewees were selected to mirror the broad variety of target users working in different nature conservation application domains and operating at different scales from the local to the EU-wide level. A system of target users (see Fig.3) was developed taking into account the experience gained from the project Nature-GIS (KANELLOPOULOS 2005). To further support monitoring and networking initiatives of Nature-SDIplus the questionnaire is still open at http://www.surveymonkey.com/NatureSDI_UserSurvey.

Public	Education	Research	Commercial	NGO	Citizen
General Administration EU Member States Public & Local	Basic Education Primary (4-11 y) Secondary (11-18 y)	Public Universities/ Colleagues Research Institutes	Agencies Concerned in Engineering Consulting Planning & Construction Environmental Management	Environmental NGOs All Levels (regional to EU)	You & Me everyone
Nature Conservation Nature Conservation Authorities Protected Areas	Higher Education Universities/ Colleagues Life Long Learning	Private Research Institutes	Commercial Data Providers Industrial Companies		
Public Data Provider					

Figure 3: Nature-SDIplus Target User Groups

3. Selected Aspects on Nature Conservation SDI

Based upon the information gained through the user survey (n~400), use cases were elaborated (see Fig. 4). They are presented by UML diagrams, a standardised general-purpose modelling language (GRÄSSLE, BAUMANN & BAUMANN 2007).

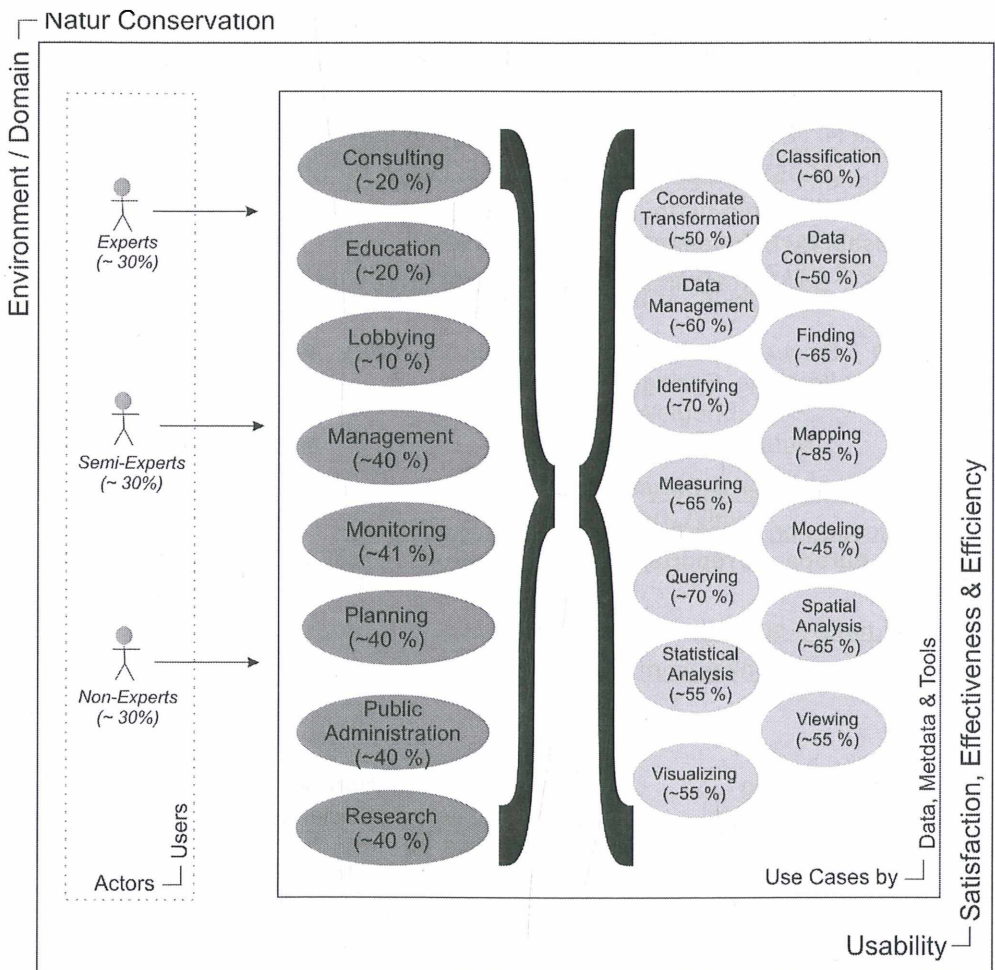


Figure 4: Simplified, generalised & schematised use case diagram concerning tasks by nature conservation data (n~400)

Concerning the spatial data content more than 70 % of the interviewees often or at least sometimes use information on *protected sites boundaries* (~90 %), *actual land use* (~80 %), *administrative units* (~ 80 %), *altitude/ topography* (~75 %), *actual vegetation* (~75 %), and *protected habitats/ biotopes* (~75 %). With reference to the geographical extent data on the local (~85 %), the regional (~95 %) and the national (~70 %) situation are used often/ sometimes. Data on neighbouring countries is rarely or never used by about 50 % of the users. Data with EU-wide, European, or global coverage is never used by ca. 60 %, 75 % respectively 80 % of the interviewees. The minor use of this *international* data is probably the reason, that users do not see difficulties (e.g. language, multicultural issues) in using foreign data.

Conclusion & Outlook

The focus on the different SDI components within user survey and use cases is crucial to ensure efficient data (re-)use and thereby SDI usability. With the bottom-up approach in developing a European SDI for nature conservation within the best practice network Nature-SDI*plus* networking, participation and integration of stakeholders for European nature conservation work is advanced. Thus, through Nature-SDI*plus* Europe is *technically & socially* merging. Considering especially the low importance that international and cross-border use of nature conservation data has, large protected areas can/ must play a key role for cross European nature conservation due to different reasons. First, in difference to most of the other target users they are strongly internationally anchored: Protected area are frequently located in borderline situations, are part of institutional networks like *IUCN*, *Europarc*, *Alpine Network of Protected Areas*, and focus on activities related to habitat networks and corridors etc.. Second, modern management per se demands for multidisciplinary and regional as well as cross border context (BRÜGGEMANN 2004). For prototyping SDI solutions, elaborating best practice examples, and gaining experience on usability for European nature conservation SDIs are best suited to be set up in large protected areas. SDIs can be an important tool to significantly enforce international nature conservation work.

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Internet Sites

URL 1: <http://inspire.jrc.ec.europa.eu/>

URL 2: [Data Specification on Protected Sites - Draft Guidelines](#)

http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/INSPIRE_DataSpecification_PS_v2.0.pdf

URL 3: <http://www.nature-sdi.eu/>

URL 4: <http://www.surveymonkey.com>

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