

SPEN – Interactions between Policy Concerning Spatial Planning and
Ecological Networks in Europe

Country Study for the Czech Republic

September 2008

Dr Jan Plesník

Agency for Nature Conservation and Landscape Protection of the Czech
Republic, Prague

jan.plesnik@nature.cz

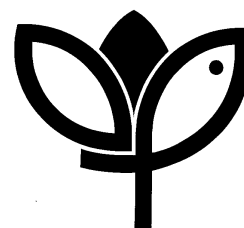


Table of Contents

1	Executive Summary.....	4
2	Introduction	5
3	Methodology.....	7
4	The Process of Spatial Planning in the Czech Republic.....	8
4.1	Definition of Spatial Planning	8
4.2	Legal Framework of Spatial Planning.....	8
4.3	Policy Framework of Spatial Planning	9
4.4	Institutional Framework of Spatial Planning	11
4.4.1.	Municipal authorities (e.g local authorities, local governments).....	11
4.4.2.	Regional authorities	11
4.4.3.	Central administration bodies.....	12
4.5	Spatial Planning: Actor Analysis.....	12
4.5.1.	Spatial Planning Information	12
4.5.2.	Approval of the Planning Analytical Materials.....	13
4.5.3.	Planning Permission Procedures.....	13
4.6.	The Spatial Planning Knowledge Base.....	15
4.6.1.	Planning analytical materials	15
4.6.2.	Planning studies	15
4.7.	Horizontal Integration	16
4.7.1.	Between regions	16
4.7.2.	Between countries	16
4.8.	Vertical Integration	17
4.8.1.	With EU Level Policies and Instruments	17
4.8.2.	With Pan European Levels Policies and Instruments.....	17
4.9.	The Dynamics of Spatial Planning in Practice	18
5	Planning Ecological Networks in the Czech Republic.....	19
5.1.	Definition of Ecological Networks	19
5.2.	Legal Framework of Ecological Networks.....	19
5.3.	Policy Framework of Ecological Networks	19
5.4.	Institutional Framework of Ecological Networks	20
5.5.	Ecological Networks Planning: Actor Analysis.....	20
5.6.	Ecological Networks Knowledge Base	20
5.6.1.	Components of TSES.....	21
5.6.2.	Hierarchical structure of the TSES.....	22
5.6.3.	Criteria for the establishing the TSES	24
5.7.	Horizontal Integration	26
5.8.	Vertical Integration.....	26
5.8.1.	With EU Level Policies and Instruments	26
5.8.2.	With Pan European Level Policies and Instruments	26
5.8.3.	With Global Level Policies and Instruments	27
6	Integrating Spatial Planning and Ecological Networks: Interactions, Synergies and Barriers...29	
6.1.	Policy Interactions of Spatial Planning and Ecological Networks Integration.....	29
6.1.1.	Current status of implementing the TSES in the Czech Republic.....	29
6.2.	Process Interactions of Spatial Planning and Ecological Networks Integration	30
6.3.	Synergies/Opportunities of Spatial Planning and Ecological Networks Integration	30
6.4.	Barriers to Spatial Planning and Ecological Networks Integration	30
7	Conclusions and recommendations	32
8	References	34
9	Annexes.....	38
Annex 1	List of national laws dealing with ecological networks in the Czech Republic	38
Annex 2	Hierarchy of the ecological network in the Czech Republic.....	39
Annex 3	List of acronyms	39

1 Executive Summary

In spite of some shortcomings and the as yet unsolved problems, particularly in relation to the real role of the individual biological/ecological corridors (biocorridors) in supporting the movement of organisms across the landscape, the Territorial System of Ecological Stability of the Landscape (TSES) can help to reduce biodiversity loss including that at the landscape level in the Czech Republic. At this moment it is an important tool to allow the State Nature Conservancy authorities to manage nature outside Specially Protected Areas, *i.e.* in the non-protected landscapes.

The Czech Republic is among the European countries, where the establishment and management of ecological networks at various spatial scales have been included in the nature conservation and landscape management legislation. In addition, the issue has also been included into the country's spatial planning legislation, *i.e.* the Building Act., The TSES therefore acquires general obligatory character within the process of approving land-planning documentation. In practice, the ecological network should also be considered when elaborating proposals for comprehensive land consolidation/re-plotting and for the Forest Management Plan (basic forest management planning tools for both governmental and private owners). Spatial planners are generally willing to allocate some lands for the purpose of nature conservation and landscape protection, but particularly at the local level, the identification of the TSES components provided by municipalities to the State Nature Conservation authorities are often of low quality. The ecological network itself is very often considered as only paper- or computer work.

Keywords: ecological network, multi-level hierarchy, spatial planning, nature conservation, landscape management, land use, Territorial System of Ecological Stability of the Landscape, TSES, Czech Republic

2 Introduction

The large-scale natural and semi-natural habitat fragmentation and loss caused by agricultural intensification and infrastructure and urban development have significantly changed the landscape in Europe, particularly in its western and central part. The concept of ecological/environmental networks as a land-use planning method has its origin both in Europe and North America in population dynamics, community ecology and landscape and spatial ecology (PULLIAM 1988; RICKLEFS & SCHLUTER 1993; SMITH & HELLMUND 1993; FORMAN 1995; DIAS 1996; FARINA 1998; NAVEH 2001; OPDAM *et al.* 2002; FORTIN & DALE 2005). Island biogeography (MACARTHUR & WILSON 1967), metapopulation theory (LEVINS 1969, 1970; HANSKI 1998, 1999; HANSKI & GAGGIOTTI 2004) and ecosystem science (PICKETT *et al.* 1992, 1997; PICKETT & OSTFELD 1995) have also played an important role in the development of the ecological network concept. Another important theoretical source of the ecological network concept is conservation genetics aiming at the survival of small populations, often affected by habitat fragmentation and loss (YOUNG & CLARKE 2000; FRANKHAM *et al.* 2002; FRANKHAM 2003). The knowledge of ecological networks is sometimes considered as a specific scientific discipline, called *corridor ecology* in the U.S. (HILTY *et al.* 2006).

An ecological network is a system of representative core areas, corridors and buffer zones designed and managed in such a way as to preserve biological diversity, maintain or restore ecosystem services and allow a sustainable use of natural resources through interconnectivity of its physical elements within the landscape and existing social/institutional structures (UNEP 2003). Landscape connectivity is the degree to which the structure of the landscape helps or hinders the movement (dispersal, migration, *etc.*) of wildlife species (TISCHENDORF & FAHRING 2000). Connectivity is species and landscape-specific. A landscape is well-connected when organisms (or natural processes) can readily move among habitat patches over a long-time. The issue of landscape connectivity has been one of the main topics in current ecology, particularly in the developed world (SELMAN 2005; WU & HOBBS 2007).

The ecological network concept has been developing worldwide since the 1970s. In spite of some controversies, ecological networks have become a practical nature conservation and landscape management tool. According to the most recent data, there are 150 landscape-scale or regional (*sensu* supranational) ecological networks in place or under development globally (BENNETT & MULONGOY 2006). In Europe, 45 sub-national or national ecological networks have been or are being developed (BONNIN *et al.* 2007). A critical assessment of ecological networks as conceptual frameworks or operational tools in nature conservation and landscape protection, particularly in Europe, has also been recently published (BOITANI *et al.* 2007).

A concept of an ecological network was formulated in the former Czechoslovakia in the late 1970s and early 1980s. An interdisciplinary team of spatial/land-use planners and scientists, mainly from Brno and Bratislava, started to develop ideas about a *skeleton of ecological stability*. The *territorial system supporting landscape ecological stability* concept was then formed. The Territorial System of Ecological Stability of the Landscape (TSES) concept was a response to large-scale natural and semi-natural habitat fragmentation and large-scale technocratic projects and a functional simplification of the collectivised farmland in former Czechoslovakia (BUČEK *et al.* 1986, MIKLOS 1989, BUČEK & LACINA 1996, MACKOVČIN 2001, LÖW & MÍCHAL 2003, MACKOVČIN *et al.* 2005). In Europe, the first ecological networks were developed in Baltic countries and in former Czechoslovakia (MÍCHAL & PLESNÍK 1995, JONGMAN *et al.* 2004).

This report presents the current status of spatial planning¹ and describes the ecological network² concept implementation. Special attention is paid to their mutual interactions as well as the experience from everyday practice. From a point of view of effective protection, conservation and sustainable use of biological diversity and its components, spatial planning is crucial because it defines spatial conditions of nature and the landscape at various time and spatial scales. In some countries including the Czech Republic, traditional, although in some respect artificial separation of

¹ In the official documents of the Ministry of Regional Development of the Czech Republic including the official translation of the laws into English, the term *town and country planning* is used for spatial planning *sensu* this report (e.g., HALASOVÁ & ŠILAROVÁ 2007). Spatial planning is considered to be the *terminus technicus* for inside building design. In the documents of the Ministry of the Environment of the Czech Republic, the term *land-use planning* is often applied (PLESNÍK & STAŇKOVÁ 2001; MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC 2005). In some cases, the translation *physical planning* is also used.

² The ecological network has three levels (PLESNÍK 2004): (i) biological/ecological infrastructure in the landscape; (ii) management of the ecological network components; (iii) stakeholders involvement. With respect to the topic of the report, the first level is given particular consideration.

the issues dealing with land-use and spatial management into various sectors could reduce the effectiveness of the management of the environment, landscape and nature. Therefore, it is important to seek compromises between nature conservation and landscape protection on the one hand and other human interests in the present and future development in the landscape on the other.

3 Methodology

The report is based on the following information sources:

- a) Published methodologies and handbooks on spatial planning and ecological networks in the Czech Republic;
- b) Published articles on spatial planning and ecological networks in the Czech Republic, both in scientific and popular journals in the Czech Republic and abroad;
- c) Information on the issue available publicly on the internet (accessed 20 August, 2008);
- d) Interviews with officers both in the State Administration and Self-Government (*i.e.* territorial autonomous authorities or regional/local administration – see below) at all the appropriate levels, NGO members and academicians across the country;
- e) Minutes from meetings and unpublished reports on spatial planning, ecological networks and their mutual interactions – see References.

4 The Process of Spatial Planning in the Czech Republic

4.1 Definition of Spatial Planning

The rather broad definition of spatial planning is given in Act No. 183/2006 Gazette on Urban and Country Planning and Building Code (the Building Act)³, as amended later:

- *The objective of spatial planning is to set out pre-conditions for building/construction and for the sustainable development of the territory, creating favourable conditions for a balanced relationship between environment, for the economic development and cohesion within the human community of the territory and of meeting the needs of the present generation without compromising the ability of future generations to meet their own needs (Part 3, Chapter 1, Article 18, paragraph 1).*
- *Spatial planning provides the pre-conditions for sustainable development of the territory by means of a systematic and comprehensive solution for purposeful use and spatial configuration of the territory, aiming at reaching generally beneficial harmony among public and private interests on territorial planning. For this purpose, it monitors the social and economic potential of the development (Part 3, Chapter 1, Article 18, paragraph 2).*
- *Spatial planning protects and develops the natural, cultural and civilization values of the territory for the public interest, including urban planning, architectural and archaeological heritage. It protects the landscape as the substantial component of the environment of the inhabitants' life and the basis of their identity (Part 3, Chapter 1, Article 18, paragraph 4).*

4.2 Legal Framework of Spatial Planning

The main legal tool in spatial planning in the Czech Republic is the Building Act. With respect to spatial planning, it lays down in particular the objectives and tasks of spatial planning, the system of spatial planning authorities, spatial planning documentation, the assessment of impacts on sustainable development of the territory, decision-making process within the territory, conditions for building, land development and for the public infrastructure preparation and education/training/skills requirements for spatial planning.

The Building Act is being implemented by a series of decrees⁴. , Local and regulatory plans are described in detail in appendices, together with the territory's sustainable development impact assessment. The general requirement for land and territorial use within the particular territory including building location are described in a separate decree⁵.

There are also special laws on the issues related to spatial planning⁶. Due to the basic land-use characteristics of the Czech Republic (54 % of the country is covered by farmland and the proportion of arable land is among the highest in Europe, PLESNÍK & STAŇKOVÁ 2001, MINISTRY OF AGRICULTURE OF THE CZECH REPUBLIC 2004, PLESNÍK 2004), special attention is paid to legislation concerning agricultural lands⁷. The process of land replotting and consolidation plays a particularly important role in the country, where following the political, economical and social changes in 1989,

³ Referred to as Building Act in the remainder of the report

⁴ Implementing decrees to the Building Act dealing with spatial planning are: Ministry of Regional Development of the Czech Republic Decree No. 500/2006 Gazette and Ministry of Regional Development of the Czech Republic Decree No. 501/2006 Gazette, Ministry of Regional Development of the Czech Republic Decree No. 500/2006 Gazette on Planning Analytical Materials, Planning Documentation and Ways of Planning Activities Filing specifies contents of planning analytical materials.

⁵ Ministry of Regional Development of the Czech Republic Decree No. 501/2006 Gazette on General Territorial Management Requirements

⁶ General environmental protection and management including EIA are set down in Act No. 17/1992 on the Environment, Act No. 244/1992 Gazette on Environmental Impacts Assessment of Strategies, Policies and Programmes, as amended later and in Act No. 100/2001 Gazette on Environmental Impact Assessment.

⁷ Act No. 139/2002 Gazette on Land Replotting/Consolidation and Land Offices, as amended later, Decree of the Ministry of Agriculture of the Czech Republic No. 545/2002 Gazette on the Process of Land Replotting/Consolidation Implementation, respectively

land redistribution and privatization have been carried out on a large scale. Local spatial configuration is also influenced by forest management⁸. and water management⁹.

4.3 Policy Framework of Spatial Planning

The need for a nation-wide spatial planning tool and for spatial planning coordination both inside the country and outside it, but within the European Union was prompted by political, social and economic changes in former Czechoslovakia in the late 1980s and early 1990s. Under the Building Act, spatial development policy is a new planning tool, provided by the Ministry of Regional Development.

The Spatial Development Policy of the Czech Republic, in relation to the carrying capacity of the territory, is concerned with elaborating and updating the development principles, setting out concepts, strategies and programmes approved by ministries and other central administrative authorities, and intensions/designs for the changes in the territory of national importance, and lays down the tasks required to ensure coordination¹⁰.

The Spatial Development Policy is a binding statutory document for the delivery of spatial development objectives; it defines the process for the commissioning (procurement, writing and development) and issuing of local and regulatory plans and decision-making within the territory¹¹. It sets out the national spatial planning priorities to ensure sustainable development within the territory¹².

The document determines areas of international, national, supra-regional¹³ (=sub-national) and trans-boundary interests in:

- a) development areas and axes, *i.e.* areas with enhanced demands for territorial changes due to concentrated activities of international and national importance¹⁴;
- b) specific areas, *i.e.* areas with specific values and specific problems, both those of international and national importance¹⁵;
- c) areas and corridors for transport and infrastructure of international and national importance¹⁶

The document sets out criteria and conditions for decision-making regarding possible alternatives or options for important changes in these areas, axes, sites and corridors¹⁷;

Assessment of its possible impacts on sustainable development is also a part of the Spatial Development Policy. The assessment describes and assesses existing and expected serious impacts and acceptable alternatives within the spatial development policy objectives¹⁸.

Under the Building Act, the Ministry of Regional Development is obliged to elaborate a draft Spatial Development Policy, which is submitted to the Government after wide consultation. The Ministry then submits the draft Spatial Development Policy to the Government for approval. Representatives of the ministries, other central administrative authorities and administrative regions may propose amendments to the draft. Together with the draft Spatial Development Policy the following documents must be submitted:

⁸ Act No. 289/1995 Gazette on Forests, as amended later, Decree of the Ministry of Agriculture of the Czech Republic No. 84/1996 Gazette on Forest Management Planning and Decree of the Ministry of Agriculture of the Czech Republic No. 55/1999 Gazette on the Means of Calculating the Extent of Loss or Damage caused to Forests

⁹ Act No. 254/2001 Gazette on Waters, as amended later, Decree of the Ministry of Agriculture of the Czech Republic No. 92/2002 Gazette on River Basins/Catchment Areas and Decree of the Ministry of Agriculture of the Czech Republic No. 431/2003 Gazette on Water Management Planning

¹⁰ (Part 3, Chapter 3, Article 31, paragraph 2)

¹¹ Part 3, Chapter 3, Article 31, paragraph 4

¹² Part 3, Chapter 3, Article 32, paragraph 1, letter a

¹³ In this report, the term *region* is used in different means, either as part of the world, *i.e.* Europe or its parts, or as a territorial autonomous unit in the Czech Republic, which is similar to province, county or Land. In the case of the former, it is indicated that region means a sub-national administrative unit.

¹⁴ Part 3, Chapter 3, Article 32, paragraph 1, letter b

¹⁵ Part 3, Chapter 3, Article 32, paragraph 1, letter c

¹⁶ Part 3, Chapter 3, Article 32, paragraph 1, letter d

¹⁷ Part 3, Chapter 3, Article 32, paragraph 1, letter e

¹⁸ Part 3, Chapter 3, Article 32, paragraph 2

- a) the report on the debate over the draft Spatial Development Policy containing the opinions of the ministries, other administrative authorities and administrative regions, remarks of the public, possible statements of neighbouring countries and the results of consultations together with explanations of how these issues have been handled/resolved/etc;
- b) results of the assessment of the impacts on the sustainable development of the territory;
- c) assessment by the Ministry of the Environment on the environmental impact with an explanation stating how any impacts have been taken into account;
- d) a formal notification stating how the assessment of the impacts on sustainable development within the territory was determined with an explanation stating which alternative was finally selected.

If the environmental impact assessment indicates that the spatial development policy has a negative impact on Bird Areas¹⁹ and Sites of European Importance²⁰, (which together form the European Community's Natura 2000 network), and no alternative solution with a smaller negative impact exists, it is possible to approve the spatial development policy only for an urgent reason of the prevailing public interest. However, this is only possible if adequate compensation measures for securing the protection and integrity of a locality being significant within European standards or the birds area have been taken in agreement with the Ministry of the Environment. Subsequently, the Ministry of the Environment notifies the European Commission of the compensation measures. If it refers to a negative impact on the Natura 2000 sites with priority natural habitat types or with priority species, it is possible to approve the spatial development policy only for overriding reasons of public health, public safety, or favourable consequences of the indisputable importance for the environment. Other urgent reasons of prevailing public interests may be only be decided by the European Commission.

Every four years, the Ministry of Regional Development has to prepare a report on the implementation of the Spatial Development Policy. Based on the report, the Government makes the decision on policy up-dating or the need to prepare a new draft²¹.

The process of producing a new Spatial Development Policy, starts with the presentation of a draft by the Ministry of Regional Development according to its obligations and the procedure as set out in the Building Act. The draft is presented to a wide range of stakeholders including the general public for consultation, and the amended version submitted to the Government for approval. Thus, in May 2008 the Ministry of regional development prepared the 2008 draft Spatial Development Policy and, by October 2008, a wide range of consultations with stakeholders including the general public, and utilising Internet technology, had been held. In parallel, consultations with neighbouring countries were also carried out. This process occurred simultaneously with the assessment of the implementation of the 2006 Spatial Development Plan by the Government.

¹⁹ in Act No. 114/1992 Gazette on the Protection of Nature and Landscape, as amended later, the term for Special Protection Areas, SPAS under Directive No. 79/409/EEC on the conservation of wild birds, commonly referred to as the Birds Directive

²⁰ in Act No. 114/1992 Gazette on the Protection of Nature and Landscape, as amended later, the term for Sites of Community Importance, SCI under Directive No. 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, commonly referred to as the Habitats Directive

²¹ Part 3, Chapter 3, Article 33

4.4 Institutional Framework of Spatial Planning

According to the Building Act the following authorities are in charge of spatial planning in the Czech Republic:

- 1) Municipalities²²;
- 2) Regions (= sub-national units);
- 3) The Ministry of Regional Development (and the Ministry of Defence in the military training areas).

Municipal and regional authorities and administrations carry out the spatial planning activities as delegated authorities.

4.4.1. Municipal authorities (e.g local authorities, local governments)

Municipal authorities protect and enhance values of the municipal territory, unless it is delegated to Regional authorities/Administrations or affected administrative offices.

As Building Offices (*i.e.* offices with regulating authority over built development), they issue planning permissions, unless stipulated otherwise by the Building Act, and planning approvals. They also provide information on procurement of planning materials or planning documentation. Planning Offices, *i.e.* the municipalities with extended authority, act in the position of "affected administrative office" in the planning permission proceedings, unless the Planning Office itself issues planning permissions. In the delegated competence, they procure local plan, regulatory plan, planning materials (planning study and planning analytical materials) and the delimitation of the developed area.

In addition, a Municipal Assembly independently decides on local and regulatory plan procurement, approves specifications and instructions for the elaboration of draft local plans,, and issues local and regulatory plans as well as built-up area demarcation.

A Municipal Council for Sustainable Development is a special authority of a municipality with extended authority/powers. It can be established by the mayor of the municipality with extended authority/powers and approved by municipalities located within its administrative district. The Council, consisting of representatives of the municipalities located within the administrative district of the municipality with extended authority/powers, discuss the locally relevant planning analytical materials and the evaluation of the plan impacts on sustainable development of the area and issues its statements on the appropriate procurer.

4.4.2. Regional authorities

Regional authorities protect and enhance values of the region. They can intervene in the activities of the municipal authority only in the cases stipulated by law and only in supra-local importance issues: they should proceed in coordination with municipal authorities.

Regional authorities and administrations are in charge of tasks and activities related to procurement of planning materials and planning documentation and with planning permission issuing. They are in charge of the filing of planning documentation.

Regional authorities and administrations also act as administrative office in procedures dealing with several administrative districts of municipalities with extended authority and in planning procedures on intentions and designs that require an environmental impact assessment. In the

²² Since 1990 a „point/mixed model“ of public administration (state and autonomous, self-governed administration) has been implemented in the Czech Republic. The latter are entitled by law to execute some state powers (state administration). According to the Constitution, the territory of country consists of municipalities, which are the basic territorial autonomous units, and the regions (administrative sub-national units), which are territorial autonomous units of higher level. The Government can intervene into the activity of the self-governed unit, only if it is necessary to defend the law and by means that are defined by law. At present, there are 6, 249 municipalities and 14 regions in the Czech Republic. Nevertheless, only 131 municipalities have more than 10,000 inhabitants (HALASOVÁ & ŠILAROVÁ *l.c.*).

delegated competence they promote spatial development principles and in cases stipulated by the Building Act also plan for areas and corridors of supra-local importance. For all the above purposes, they elaborate the necessary planning materials. Regional authorities and administrations act as general building offices and therefore issue planning permissions.

It should be noted that a Regional Assembly, in the context of its autonomous competence, sets up spatial development principles.

4.4.3. Central administration bodies

The Ministry of Regional Development is the central administration authority responsible for spatial planning. It elaborates the spatial development policy and planning materials necessary for the policy (see above). In addition, it provides methodological support for application of the up-to-date knowledge and best science available in planning activities. The Ministry of Regional Development is also the central administrative authority in the Building Code.

For military training areas, the Ministry of Defence issues local and regulatory plans and is involved in discussions on planning materials and urban studies.

4.5 Spatial Planning: Actor Analysis

The Building Act recognises different steps in the spatial planning procedure each of them with their particular actors.

A procurer (i.e. the institution which commissions the development of the spatial plan) is the relevant municipal office, Regional authority or administration, the Ministry for Regional Development or the Ministry of Defence, which elaborates the planning materials, planning documentation, delimitation of the developed area or the spatial development policy.

4.5.1. Spatial Planning Information

The Regional authority or administration, spatial planning authority, or municipality authorized to performing the activities of the procurer and the building office provide the basic spatial planning information on:

- a) Permitted land use and allowed changes in the given territory, particularly upon planning materials and the planning documentation;
- b) Conditions of issuing the regulatory plan, planning permission, including the list of the respective authorities;
- c) Conditions of issuing the planning approval in cases, when it is possible to replace by it the planning permission, including the list of the respective authorities.

An applicant for the spatial planning information must state in the application the particular requirements for information related to his/her intention/design/programme to change the territory and particular data on his/her intention/design/programme, particularly the purpose and technical data on the building/structure or another measure in the territory. The provided spatial planning information applies one year from the date of its issuing, if within the term, the authority, which issued it, does not notify the applicant that there occurred the change in conditions, under which it was issued, particularly based on the performed updating of the appropriate planning analytical materials, on approval of the report on implementing the development principles, and on the report on the implementing the plan.

Under the Building Act, public consultations to underpin the elaboration of the planning documentation are ordered by the procurer. If it is deemed useful or if it is necessary due to the size of the area, the procurer orders more public consultations. The procurer keeps a written record of the public consultations. During the public consultation the assessments, objections and remarks are submitted in writing and they must be supplemented with the identification data and the signature of the person, who submits them, and are attached to the minutes on the public

proceedings. Always at the public proceedings the procurer guarantees, in cooperation with a natural person, who is authorized pursuant to special regulation, to design activity in building/construction (designer) the interpretation of the planning documentation.

Spatial planning information is available to planners and developers upon request. When a proposed development concerns a significant area, additional public consultation may be ordered. Objections and remarks may be filed by private and public authorities in writing. The public may also be represented by an authorised representative, public or private, including NGOs or other civil society organizations²³.

4.5.2. Approval of the Planning Analytical Materials

The planning analytical materials (see below) for the administrative unit of the municipality with extended authority/powers and their updates are submitted by the procurer to the Municipal Council for Sustainable Development for review. Within 60 days, the Council informs the procurer about its analysis regarding the sustainable development of the territory. If the Council of municipalities does not notify its statement within this period, it is applied that the body agrees with the sustainable development of the territory analysis.

If the procurer does not agree with the assessment of the Municipal Council for Sustainable Development he sends the planning analytical materials together with the assessment to the Regional authority or administration, which considers the disagreement and possibly gives the procurer the instruction on how to improve them. The procurer improves the planning analytical materials according to the result of the debate and immediately sends them to the Regional authority or administration.

The planning analytical materials for the region²⁴ and their updating are elaborated by the Regional Authority or administration on the basis of the municipal planning analytical materials. Within six months, the Regional authority or administration sends the regional planning analytical materials to the Ministry for Regional Development and the Ministry of the Environment.

4.5.3. Planning Permission Procedures

Planning permission is the decision of the building office on:

- a) Location of a structure/building/facility;
- b) Land use change in the territory;
- c) Alteration of the structure/building/facility and on the alteration of the impact of the structure/building/facility on the use of the territory;
- d) Land replotting/consolidation;
- e) Protective/buffer zone.

Stakeholders in the planning permission proceedings are listed in the Building Act.

Appropriate building offices issue planning permissions according to the planning permission procedures. The participants in the planning proceedings are the applicant, the local municipality, the owner of the land plot or the construction, citizens whose property or other ownership rights to

²³ recognised under the Act No. 114/1992 Gazette on the Protection of Nature and the Landscape. The representative of the public must be authorized by minimally 10 % of the inhabitants of the municipality with less than 2,000 inhabitants or by at least 200 inhabitants of the appropriate municipality, who apply a materially consenting remark to the plan before approval, or to the plan draft. The representative of the public may be also authorized by at least 500 inhabitants of the region (= an administrative sub-national unit) or minimally by 10 % of the inhabitants of any municipality in region with less than 2,000 inhabitants or minimally by 200 inhabitants of a municipality in region, if they filed a materially consenting remark to the development principles draft. Consequently, the Building Act gives in details the particular ways to authorize the representative.

²⁴ administrative sub-national unit

neighbouring lands or constructions may be affected by the decision and other citizens. Those who rent the building or land plot concerned are not included in the planning proceedings²⁵.

According to the Building Act²⁶, the spatial planning authorities and the building offices should cooperate with the respective authorities protecting the public interests such as the State Nature Conservancy authorities.

Planning permission proceedings are taken upon request of the applicant. Besides general data the request includes basic information on the proposed intention or design, construction methods and the identification of the land plot. If required by the nature of the proposed intervention an environmental impact assessment must be carried out by the appropriate authority²⁷. If the intervention is anticipated to have effects reaching beyond the area perimeter, the need for a protective buffer zone must also be considered²⁸.

It is the building office's responsibility to start the planning permission proceeding and to organise the legally requested public hearing, at which persons²⁹ or groups (if needed represented by a spokesperson³⁰) affected by the plans can file their objections and all views of stakeholders must be presented.

Within the planning permission proceedings, the municipality takes account of the possible objections on the protection of the municipality's interests and the interests of the municipality's citizens. The person who is the participant in the planning permission proceedings pursuant special regulations may, within the planning permission proceedings, submit the objections, if the discussed intention/design/programme affects the public interest, the protection of which is supervised and guarded by that person pursuant to a special regulation. The other persons involved in the planning permission proceedings, may submit the objections against the discussed intention/design/programme to the extent, by which his/her right is directly affected.

The building office immediately publishes the notification on the planning permission proceedings initiation, together with the information on the expert opinion and the documentation on the impacts of the intention/design/programme on the environment and delivers them to the participants in the process and the respective authorities. At the same time the building office publishes the expert opinion and the documentation of the impacts of the intention/design/programme on the environment in electronic format in order to enable remote access. Anybody may send to the building office a statement on the expert opinion and the documentation of the impacts in the identical period, within which there may be submitted the binding statements and assessments, objections and remarks. The procurer makes the appropriate authority familiar with the opinions immediately. The expert opinion, documentation of the impacts and statements must be discussed at the public debate with the participation of the appropriate authority. As mentioned above, the building office notifies the holding of the public debate not less than 15 days in advance; and the authority may join the proceedings with the public oral debate. No later than 30 days from the date of the public debate, the appropriate authority sends the opinion on the assessment of the impacts of the intention/design/programme implementation on the environment to the building office. The building office publishes this opinion immediately and continues with the procedure.

Where there was no consensus among the participants in the procedure, the building office decides on the objections on the basis of general requirements on construction, general requirements on the use of the territory, binding statements and assessments of the respective authorities, or the technical standards, if such an objection does not exceed the scope of its jurisdiction. If there was no consensus on a civil basis, the building office makes its opinion about it and decides on the merits; this does not apply in the case of objections referring to the existence of the right or the scope of the ownership/proprietary rights representative (Part 3, Chapter 3, Article 89, paragraphs 4 and 5).

²⁵ Part 3, Chapter 3, Article 85

²⁶ Chapter 1, Article 4, paragraph 2

²⁷ Act No. 114/Gazette on the protection of Nature and the Landscape, as amended later; Act No. 100/2001 Gazette on Environmental Impact Assessment, as amended later

²⁸ Part 3, Chapter 3, Article 86, paragraphs 4 and 5

²⁹ Part 3, Chapter 3, Article 89, paragraph 4).

³⁰ Part 3, Chapter 3, Article 87, paragraph 3

The building office approves the suggested intention/design/programme by giving planning permission and sets out the conditions for the use and protection of the territory and for further preparation and implementation of the intention/design/programme, particularly for the design preparation of the structure/building/facility. Within its decision the building office decides on the objections of the participants in the proceedings, within the reasoning it assesses the remarks of the public and determines the period of validity of the decision on condition that it shall be longer than that stipulated by this Act. If the programme of the applicant is not in accordance with the requirements stated in the Building Act or by the special regulations including the Act on the Protection of Nature and the Landscape, the building office dismisses the application for the issuing the planning permission. The approved permission is valid for two years after the day when it comes into force.

4.6. The Spatial Planning Knowledge Base

The non-statutory planning materials include:

- a) Planning analytical materials, which ascertain and assess the state and development of the territory;
- b) Planning studies, which verify possibilities and conditions of the changes in the territory; they serve as the basis for procurement of the planning spatial development policy, planning documentation, their changes and for the decision making in the area.

4.6.1. Planning analytical materials

The planning analytical materials include the description and assessment of the state and development of the territory, its values, and the permitted land use changes³¹; or, arising from the properties of the territory, intentions/designs/programmes for implementing the changes in the territory, describing and assessing the territory's status in relation to sustainable development, and identifying problems to be solved in the planning documentation³².

The spatial planning authority elaborates the planning analytical materials which are necessary for elaborating the plans and regulatory plans for its administrative unit. The Regional authority or administration elaborates the planning analytical materials for the territory of its administrative region in relation to the required level of detail and extent for the spatial planning principles. The planning analytical materials are based on the survey of the territory and on the data on the territory and can include maps. The information includes the state of the territory and indicates the rights, duties and land use limitations, at the level of an area, a land plot, a natural or landscape structure³³. The information should also present the intentions/designs/programmes to implement changes in the territory. The information on the territory also includes the origin, raising, collecting, processing of the data and the way they are approved or coming into force and effect.

The data on the territory are provided (immediately after collection) to the procurer by the public administration authority, the legal entity established by the above authority and the owner of the transport and technical infrastructure, preferably digitized. These authorities are responsible for the data correctness, completeness and relevance. The data on the territory may be used by the procurer only for planning activities such as the establishment and maintenance of technical maps and for the activity of the designer of the planning documentation and the planning study. The owner of the public infrastructure provides the spatial planning authority with the present situation of the public infrastructure. The procurer continuously updates the planning analytical materials based on new data on the territory and the survey of the territory area and performs their complete updating every two years.

4.6.2. Planning studies

³¹ Act No. 114 Gazette on the Protection of Nature and the Landscape, as amended later

³² More details are provided by Ministry of Regional Development of the Czech Republic Decree No. 500/2006 Gazette on Planning Analytical Materials, Planning Documentation and Ways of Planning Activities Filing

³³ Act No. 114/1992 Gazette on the Protection of Nature and the Landscape, as amended later

A planning study suggests, examines and considers possible solutions of the selected problems, or arrangements for certain functional systems within the territory, *e.g.* the public infrastructure or Territorial System of Ecological Stability, which could significantly impact or limit the use and arrangement of the territory or of its selected parts.

The procurer commissions the planning study in such cases, when it is imposed by the planning documentation, from its own intention or others. Within the planning study elaboration the procurer lays down its contents, scope, objectives and purpose.

4.7. Horizontal Integration

Cooperation of spatial planners with colleagues across both regional (=sub-national) and national borders is specified in the Building Act. As it is mentioned above, the tool for the collaboration as well as for cross-border spatial planning policy and project coordination is the Spatial Development Policy³⁴.

4.7.1. Between regions

The Spatial Development Policy document determines areas of international, national, supra-regional (=sub-national) and trans-boundary interests in development areas and axes, *i.a.* areas with enhanced demands for territorial changes which by their importance exceed the borders of one region (an administrative sub-national unit). In addition, the specific areas are defined as *i.a.* areas with specific values and specific problems, which, by their importance, exceed the border of one administrative region. The spatial development policy of the Czech Republic also deals with areas and corridors for transport and infrastructure which by their importance exceed the border of one administrative region.

The Ministry of Regional Development takes into account *i.a.* the statements of regions and it will modify the draft Spatial Development Policy. The Ministry will debate this modified draft with the representatives of the regions³⁵.

4.7.2. Between countries

The Ministry of Regional Development in cooperation with the Ministry of Foreign Affairs, sends the draft Spatial Development Policy to neighbouring countries, whose territories may be directly affected, for consultation³⁶. The Ministry of Regional Development then considers the possible amendment of the draft Spatial Development Policy according to the statements of neighbouring countries.

³⁴ Part 3, Chapter 3, Article 31

³⁵ Part 3, Chapter 3, Article 33, paragraph 3

³⁶ Part 3, Chapter 3, Article 33, paragraph 5

4.8. Vertical Integration

4.8.1. With EU Level Policies and Instruments

Both European Community initiatives (European Spatial Planning Observation Network – ESPON, European Spatial Development Perspective – ESDP) and laws (Water Framework Directive³⁷, Environmental Impact Assessment (EIA) Directive³⁸ and Strategic Environmental Assessment (SEA) Directive³⁹) have been a background for elaborating and passing the Building Act. In addition, the above act transposed the European Community's legislation; under the Building Act the draft Spatial Development Policy is based *i.a.* on international obligations of the Czech Republic⁴⁰.

4.8.2. With Pan European Levels Policies and Instruments

4.8.2.1. Aarhus Convention

The Czech Republic signed the Aarhus Convention⁴¹ at the 3rd Ministerial Conference "Environment for Europe" (Aarhus, Denmark) on 25 June 1998, and ratified it on 6 July 2004. It became a Party to the Aarhus Convention on 4 October 2004. The Convention's National Focal Point is the Ministry of the Environment.

The main tool for implementing the Aarhus Convention in the Czech Republic is Act No. 123/Gazette on the Right to Environmental Information, as amended later.

4.8.2.2. European Landscape Convention

The Czech Republic has been actively involved in negotiations about the European Landscape Convention, because its representative is one of the authors of the Convention's text (1999 – 2000). The country ratified the European Landscape Convention on 3 June 2004 and became a Party to it on 1 October 2004 (PLESŇÍK 2005).

Before the ratification, a legal analysis confirmed that all requirements and tasks described in the convention were included into the Czech Republic's legislation. Because of the convention's multi-sectoral character, a special committee was established by the Ministry of the Environment, consisting of representatives of all the ministries concerned, the Academy of Sciences and NGO's to raise awareness and support before the official negotiation of the Convention among the stakeholders. Therefore, the European Landscape Convention was approved by the Government and both chambers of the Parliament of the Czech Republic and signed by President. Consequently, the Inter-Sectorial Coordination Committee for the European Landscape Convention Implementation was established.

The Convention's National Focal Point is the Ministry of the Environment which also established the Sectorial Committee for the European Landscape Convention Implementation, consisting of representatives of the Ministry's individual departments, agencies and other institutions. Some technical background information was collected by research projects, funded by the Council for Research and Development of Technologies of the Government of the Czech Republic and by the Ministry of the Environment. A landscape planning methodology was also prepared while pilot landscape plans were elaborated and implemented in some municipalities or areas. The comprehensive *Atlas of the Czech Republic's Landscape* has been under preparation by a number of institutions and experts, presenting *i.a.* a landscape classification system in the country.

The strategic document, *The European Landscape Convention Implementation Plan of the Ministry of the Environment of the Czech Republic (2008-2013)* is currently being prepared. After its

³⁷ Directive No. 2000/60/EC establishing a framework for Communication in the field of water policy

³⁸ Directive No. 85/337/EEC on the assessment of the effects of certain public and private project on the environment

³⁹ Directive No. 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment

⁴⁰ Part 3, Chapter 3, Article 33, paragraphs 2, letter c

⁴¹ UNECE (United Nations Economic Commission for Europe) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters

approval by the Ministry's Management Board, it shall become one of the background documents for *The European Landscape Convention Implementation Plan of the Czech Republic (2008-2013)*, which shall be approved by the Government.

4.9. The Dynamics of Spatial Planning in Practice

The dynamics of spatial planning (preparation including consultation and participation of various stakeholders, implementing spatial planning documents and decisions into land-use policy, evaluation of spatial planning processes, outputs and implementation in the field) is described in the details in the above parts of the study.

5 Planning Ecological Networks in the Czech Republic

5.1. Definition of Ecological Networks

The TSES is a mutually interconnected complex of both natural and modified, but semi-natural ecosystems which maintains natural balance in the landscape⁴². For the purpose of the TSES concept, ecological stability is seen as the ability of an ecosystem to buffer disturbances caused by external factors and to maintain its structure and functions (BUČEK *et al.* 1986, 1996).

5.2. Legal Framework of Ecological Networks

The main legal instrument for developing and implementing the TSES has been Act No. 114/1992 Gazette on the Protection of Nature and the Landscape, as amended later. TSES is a category of generally protected areas under Act. No. 114/1992 Gazette, as amended later.

In addition to the above definition of the TSES, Part 2 of the Act (Article 4, paragraph 1) states “... the protection of the System of Ecological Stability is a duty of all owners and users of the land plots which forms its basis; its formation is public interest, shared by the land owners, communities and the Government. “

Some details are included into the Ministry of the Environment of the Czech Republic Decree No. 395/1992 Gazette, which complements and implements the above act. The decree⁴³ explicitly speaks of continuous evaluation of the system of ecological stability (*i.e.* the TSES) by the Nature Conservancy Authority from the point of view of its stabilising function. In the first place, the evaluation delineates boundary lines of the TSES elements, assesses the level of biological diversity, the generic structure of the vegetation and the resilience. The result of the evaluation is the decision whether the TSES is satisfactory and whether it fulfils the stabilising function in the landscape. The decree also defines the TSES components (*i.e.* biocentres and biocorridors).

The TSES documentation is an obligatory background for the land-use/territorial planning, similarly to Specially Protected Areas. The TSES obtains a general obligatory character within the process of approving land-planning documentation, and in proposals for comprehensive land consolidation/re-plotting and Forest Management Plan (see above).

5.3. Policy Framework of Ecological Networks

The TSES concept has been included in most national policy documents dealing with sustainable development, environmental protection, nature conservation and landscape management (MLČOCH *et al.* 1998, MINISTRY OF THE ENVIRONMENT 2004, 2005, CZECH GOVERNMENT COUNCIL FOR SUSTAINABLE DEVELOPMENT 2004). The main principles of the TSES have been presented in the reports, describing the state, changes and trends in the environment, nature and the landscape incl. agricultural one in the Czech Republic (PLESNÍK & STAŇKOVÁ 2001, BROŽOVÁ 2004, PLESNÍK 2004, MINISTRY OF AGRICULTURE OF THE CZECH REPUBLIC 2004, OECD 2005, CENIA 2007, MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC/CZECH STATISTICAL OFFICE/CENIA, CZECH ENVIRONMENT AGENCY 2007). Therefore, the TSES concept has been officially supported by the Government.

⁴² Act No. 114/1992 Gazette on the Protection of Nature and the Landscape, as amended later, Part 1, Article 3, paragraph 1, letter a

⁴³ Article 4, paragraphs 1 and 2

5.4. Institutional Framework of Ecological Networks

The Ministry of the Environment of the Czech Republic is the only authority responsible for the supra-regional TSES⁴⁴. The authority charged with keeping the files and documentation of the supra-regional TSES is the Agency for Nature Conservation and Landscape Protection of the Czech Republic.

Regional authorities/Administrations are responsible for designing, developing and assessing the Regional Territorial Systems of Ecological Stability, while municipalities with extended competences (powers) play the same role for Local Territorial Systems of Ecological Stability.

5.5. Ecological Networks Planning: Actor Analysis

Since the TSES are a legally binding component of spatial planning, which should be taken in account during any spatial planning process, the main actors in elaborating the planning analytical materials are the same as for the spatial planning itself.

5.6. Ecological Networks Knowledge Base

TSES is a network of ecologically significant segments of the landscape, efficiently distributed on the basis of functional and spatial criteria. Aims of the TSES include providing favourable influences on the surrounding, ecologically less stable parts of the landscape, support of multifunctional use of the landscape and conservation of significant landscape elements and more generally, improving landscape ecological stability, protection and strengthening life-supporting ecosystem functions as well as preserving significant landscape phenomena.

The purpose of the TSES is also to maintain and restore landscape diversity and to support non-productive functions of the landscape as well as the ability of ecosystems to provide society with services (soil forming, photosynthesis, flood control, etc. – MA 2005). It also forms a condition for permanent existence of native wildlife species populations, species assemblages, guilds (ecological/functional units) and communities in the landscape that will interact with the semi-natural and artificial surrounding landscape.

The TSES is based on the following five principles (BUČEK *et al.* 1986, LÓW *et al.* 1995, KUBEŠ 1996):

1. *Principle of representativeness*: TSES must embrace all typical types of natural communities in each region. Therefore, the TSES should involve a complete mosaic of natural vegetation communities in the particular biogeographical unit. Each biogeographical unit should be represented by at least one biocentre in the biogeographical unit that is one hierarchic level higher. This principle is adhered to on each of the three hierarchical levels.
2. *Principle of limiting parameters*: The principle determines the admissible size of a biocentres and biocorridors depending on the type of vegetation community. The biocentres are defined by a minimum area, while the biocorridors by a minimum width and maximum length. The limiting values vary according to biogeographical characteristics and hierarchical level.
3. *Principles of connectivity*: Biocentres must be connected by biocorridors. The biocorridors must not be interrupted by ecological barriers.
4. *Principle of the current state of the landscape*: The TSES concept prefers landscape elements of higher ecological value. In other words, the principle places habitats into TSES with respect to the current ecological values of its communities.
5. *Principle of social limits and objectives*: The implementation of TSES should not conflict with other social objectives (e.g, water and wind erosion control, hydrological measures, etc.). The principle assesses the possibilities of TSES design with respect to social limits and intentions.

⁴⁴ Act No. 114/1992 Gazette

The TSES concept is based on island biogeography, sink-source theory, current approaches in landscape ecology (landscape seen as a dynamic mosaic of various habitat patches) and spatial ecology (meta-population approach), population genetics, new non-equilibrium paradigm, etc.

Contrary to the bio-ecological approach, which has been applied mainly in West Europe (e.g., the Netherlands), the TSES concept is similar to the concept developed in the Baltic States based more on eco-stabilizing approach (JONGMAN *et al. l.c.*). It also uses some flagship or keystone species (e.g., Eurasian Otter *Lutra lutra*) in particular for raising general public awareness of an ecological network.

Among various levels of the hierarchy of biological systems/biological diversity, the TSES concept stresses the level of biological/ecological community/assemblages in a broader sense of the term. Therefore, it deals both with communities of various higher taxa *sensu synusium* (e.g. bird communities), plant (*phytocenoses*) and animal (*zoocenoses*) communities or biological communities (*biocenoses*).

Due to the conservation status of nature and the landscape, the TSES cover mainly semi-natural habitats at various levels (local, regional = sub-national, supra-regional). That is why the concept also highlights habitat and ecosystem restoration and adaptive ecosystem management. Contrary to the existing network of Specially Protected Areas (national network) or the European Union's Natura 2000 network, it also includes habitats which are not extraordinary from a point of view of nature conservation (extraordinary nature conservation value), but would play a crucial role in supporting dispersal or migration of wildlife species or maintaining life-supporting ecosystem functions.

The development of the TSES and its identification in the field uses data on hydrology and climate, species composition, species diversity and edge composition. Data on actual vegetation have been compared with natural vegetation composition. Historical documents (historical maps, air photographs, cadastre data, etc.) have been used as a tool to confirm the consistency of the landscape structure and for planning the TSES components. In some cases, the stand continuity is involved, being a useful parameter for the TSES developing (SKLENIČKA & CHARVÁTOVÁ 2003).

The most suitable method for the developing TSES is landscape synthesis. Therefore, prior landscape screening is essential. It involves establishing an inventory of primary (natural) landscape structures and locating secondary (existing) landscape structures. The assessment part consists of the identification of the eco-stabilizing function of both natural and secondary landscape structures and their integration into the existing landscape elements from a point of view of ecological stability (LÓW *et al. l.c.*). A methodology, which introduces the practical use of GIS methods in the developing the TSES was proposed (*cf.* OPRŠAL 2006). The detailed methodology for the design and development of the TSES, particularly at the local level, has been published (LÓW *et al. l.c.*).

5.6.1. Components of TSES

The TSES comprises the most valuable landscape elements, supplemented by additional ones.

5.6.1.1. Biocentres (core areas)

According to the Ministry of Environment a *biocentre* is a habitat or a system of habitats which makes possible by its state and size the permanent existence of a natural or modified, but semi-natural ecosystem⁴⁵. In other words a *biocentre* is a habitat or a complex of habitats which support the permanent existence of wildlife species populations, species assemblages, guilds and communities as well as of a natural or semi-natural ecosystem. Survival of these populations, however, is only possible if the biocentre is connected in a suitable manner with similar biocentres.

⁴⁵ Ministry of the Environment Decree of the Czech Republic No. 395/1992 Gazette, as amended later, Article 1, letter a

A *representative biocentre* is a zonally arranged natural vegetation community of a biogeographical units and azonally arranged floodplain natural vegetation community.

A *unique biocentre* is a vegetation community whose existence depends on the specific patterns of the site or is dependent on human intervention. The examples include a wetland with dry surrounding habitats within the landscape matrix or a soil with specific soil chemistry pattern surrounded by standard soils.

A *contact biocentre* is located just on the boundary of similar biogeographical units.

5.6.1.2. Biocorridors

A *biocorridor* (biotic dispersal & migration corridors) is an area which does not make possible to the critical part of organisms permanent long-term existence, but it makes possible their migration between biocentres: thus, it makes a real interconnected network from isolated biocentres⁴⁶. The movement of organisms among biocentres includes both dispersal and migration. Biocorridors are the linear elements in the landscape.

A *connecting corridor* connects biocentres that host similar communities, particularly representative biocentres with similar ecosystems.

A *contact biocorridor* connects a biocentres with somewhat different communities and usually passes through semi-permeable biogeographical barrier.

A *compound corridor* is composed of corridors of identical hierarchic importance and of biocentres of lower importance, enabling the length of the biocorridor to be extended.

5.6.1.3. Buffer zones

Buffer zones surround both biocentres and biocorridors and buffer, *i.e.* reduce or remove effects of drivers (pressures) coming from outside the TSES on its particular components and on the system as a whole.

5.6.1.4. Interactive elements

Interactive elements of TSES are significant landscape segments or ecologically significant linear communities, which contribute to favourable influence of biocentres and biocorridors on surrounding less ecologically stable landscape on longer distances. They support the occurrence of wild plants and animals, significantly influencing cultural ecosystem functioning Interactive elements are proposed at the local level. In addition, they often allow permanent occurrence of the particular wildlife species with fewer spatial requirements (*e.g.*, wild plants, some insects, amphibians, birds and small mammals, *etc.*). Examples include ecotone communities on forest edges, small hedgerows, clusters of trees or solitary trees in arable land (*a cultural and ecological desert*).

5.6.2. Hierarchical structure of the TSES

The hierarchical structure of the TSES is set down in Act No. 114/1992 Gazette on the Protection of Nature and the Landscape, as amended later (Part 1, Article 3. paragraph 1, letter a).

⁴⁶ Ministry of the Environment Decree No. 395/1992 Gazette, as amended later, Article 1, letter b

5.6.2.1. Supra-regional Territorial System of Ecological Stability (SR-TSES)

The Supra-Regional Territorial System of Ecological Stability (= National *sensu stricto*) is an irregular network of ecologically significant segments of the landscape, which respect a whole scale of biogeographical regions, including their buffer zones and their typical and unique communities. The supra-regional TSES is considered to be an important tool for the increase of diversification of the landscape degraded by economic activities and agriculture in the last decades. From a biogeographical and ecological point of view, the individual supra-regional TSES's (biocentres, biocorridors) components are at least of national importance. The supra-regional biocentres are relatively large ecologically significant units, covering at least 1,000 hectares, and areas which are representative of the biogeographical region or unique in the framework of the biogeographical sub-province, maintaining viable representative types of natural ecosystems. Supra-regional biocorridors are ecologically significant landscape segments enabling migration and dispersal of wildlife and connect biocentres. Supra-regional biocentres need to cover an area of at least 6,500 ha on agricultural land, if they are to fulfil their functions.

All biocentres were identified on the basis of their relative intactness according to the knowledge of the local experts, published data, the presence of the typical elements of the biota and group of ecosystems (ecocomplexes) and the occurrence of significant geological and geomorphological features. For reasons of representativeness, supra-regional biocentres can also include compensatory communities, areas in some cases substantially modified by human influence whose potential at the site corresponds with the missing ecosystems.

The aims of drafting the documentation of the supra-regional biocentres of the TSES include:

- 1) Landscape and habitat mapping (according to PELLANTOVÁ *et al.*, 1994)
- 2) Drafting of the background information about ecotopes for the evaluation of the representativeness of core areas
- 3) Location of the current ecosystems
- 4) Determination of potential ecosystems
- 5) Defining of the core areas of a supra-regional biocentre
- 6) Defining of the minimum area of a biocentre
- 7) Evaluation of the representativeness of a biocentre in the relation to the biogeographical region
- 8) Evaluation of the functionality of a biocentre by comparing the topical and potential ecosystems
- 9) Identification of the principles of management in the biocentre
- 10) Drafting of the management plans for some core areas.

The process of drafting documentation of supra-regional biocentres of the TSES in the Czech Republic includes in particular a detailed description of the working process using the rapid method, e.g. accurate demarcation of boundary lines and delivering the results to elaborators of land-use plans. The drafting of the documentation consists of mapping the current state of the landscape according to a standard methodology (PELLANTOVÁ *et al. l.c.*). This methodology was elaborated, and includes guidelines to the graphical representation of the output. It explicitly demonstrates the value of the whole mapped area, including its most valuable parts for the identification of the core area of a supra-regional biocentre, the possibilities of reduction of the area size of the supra-regional biocentre and, particularly, it offers guidance for specific management of both forest and non-forest parts of the supra-regional biocentre.

Currently, regional branches of the Ministry of the Environment are in charge of the SR-TSES and the SR-TSES plan is being up-dated by the Regional Authorities.

5.6.2.2. Regional (= Sub-national) Territorial System of Ecological Stability (R-TSES)

The main aims of the Regional Territorial System of Ecological Stability include improving landscape ecological stability, protection and strengthening life-supporting ecosystem functions and preserving significant landscape phenomena. The R-TSES components are considered to be of sub-national (= regional) importance. The regional biocentres are ecologically significant units, covering from 10 to 50 hectares. The Regional TSES includes elements of the Supra-regional TSES but due to a larger scale and dimension of the elements the former cannot be part of any international ecological network. Currently, the R-TSES plan is being up-dated by the Regional Authorities.

5.6.2.3. Local Territorial System of Ecological Stability (L-TSES)

According to TSES methodology, the main purpose of a local TSES is to support the surrounding landscape. Main aims include improving landscape ecological stability, the protection and strengthening of life-supporting ecosystem functions and the preservation of significant landscape phenomena. The area of local biocentres should be between 5 and 10 hectares.

Local TSES were drafted in the form of the District General Plans subsequently elaborated into physical plans of local communes and municipalities (2 km²). The Local TSES includes elements of the Regional (Sub-national) TSES but due to a larger scale and dimension of the elements the former cannot be part of any international ecological network.

Most of the local TSES plans have been financed from the funds allocated from the State Budget for land replotting and land consolidation.

5.6.3. Criteria for the establishing the TSES

In implementing TSES the following considerations are taken into account (Lów *et al. l.c.*):

- a) To comply with natural landscape structure and its predisposition for a certain risk processes as a basis for an evaluation of landscape human modification and alteration and ecological stabilization requirement analysis;
- b) To take the abundance of valuable landscape elements in the landscape matrix into account;
- c) To ensure the sufficiency of existing elements of the TSES;
- d) To prefer poly-functionality of the TSES components.

The criteria applied for the delimitation of the TSES elements are as follows:

- a) Diversity of potential natural ecosystems;
- b) Spatial relations among these natural ecosystems;
- c) Evaluation of the current status of the landscape;
- d) Evaluation of social limits and prospects.

TSES is based on the following criteria:

- a) Selection criteria
They take into account the representativeness, ecological/environmental significance, internal ecological stability, size and shape.
- b) Location criteria
They include position and spatial arrangements of ecosystems, requirements for soil and water protection, measures against water and wind erosion, supporting microclimatic, hygienic and aesthetic functions of the landscape, eco-stabilizing measures, *etc.*
- c) Implementation criteria
Implementation criteria cover *e.g.* ecological/environmental quality of the current landscape structure or existing legal protection instruments.

The spatial and functional parameters of the individual TSES components depend on the biotic, hydrological, soil and relief conditions (Tables 1, 2 and 3). The minimum necessary spatial parameters differ according to the hierarchical level of the TSES. The examples of the minimum necessary spatial parameters are given in The Table 1 and 2 (Lów *et al. l.c.*).

Table 1 The minimum necessary areas of biocentres.

COMMUNITY TYPE	BIOCENTRE	
	LOCAL	REGIONAL
Forest vegetation zone:		
Alder woods and <i>Salix-Populus</i> woods	3 ha	10 ha
Vegetation zones 1,2	3 ha	30 ha
Vegetation zones 3,4	3 ha	20 ha
Vegetation zone 5	3 ha	25 ha
vegetation zones 6,7	3 ha	40 ha
vegetation zones 8,9	3 ha	30 ha
water communities:		
Running waters	over 100 m	1-20 km
Standing waters	1 ha	100 ha
Wetlands:		
	1 ha	10 ha
Meadow communities:		
	3 ha	30 ha
steppe slopes:		
	1 ha	
Rock associations:		
	0.5 ha	5 ha
Combined communities:		
	3 ha	10 ha

Table 2 The maximum permissible lengths of simple corridors.

COMMUNITY TYPE	BIOCENTRE	
	LOCAL	REGIONAL
forest communities:	2,000 m	700 m
Wetlands :	2,000 m	1,000 m
floodplain meadow communities :		
vegetation zones 5-8	1,500 m	700m
vegetation zones 1-4	1,500 m	500 m
steppe slopes :		
vegetation zones 1-2	2,000 m	500m
vegetation zones 3-4	2,000 m	500m

In case of regional biocorridors (*i.e.*, biocorridors of regional importance), we use so-called "complex biocorridors": after 400-1,000 m, according to the permissible length of a simple corridor, we insert biocentres of local importance. Thus the length of a functionally qualified regional biocorridor can be substantially extended, reaching up to 5-8 km long.

Table 3 The minimum necessary width of simple biocorridors.

COMMUNITY TYPE	BIOCENTRE	
	LOCAL	REGIONAL
forest communities	15 m	40 m
Wetlands	20 m	40 m
floodplain meadow communities	20 m	50 m
steppe slopes	10 m	20 m

For representative supra-regional biocentres, the minimum area of 1,000 ha and more is required, and for unique biocentres, the area of less than 1,000 ha is considered to be suitable. Supra-regional biocorridors have a defined axis and a buffer zone. The minimum width of the axis of a supra-regional biocorridor corresponds with the width of the regional biocorridor of the respective type and is 2,000 m. The maximum width of the buffer zone derives from the maximum distance of local biocentres (2 km away from the axis of the supra-regional corridor on both sides).

There are several possibilities of establishing a biocentre or a biocorridor in line with the drafted General Plan of the local TSES:

- a) Planting of wood species in meadow areas;
- b) Grassing of arable land and subsequent afforestation;
- c) Establishing a biocentre on arable land with afforestation;
- d) Establishing a biocentre on arable land with tree bark and subsequent planting;
- e) Laying faggots of wood species material in the section of the established element;
- f) Establishing a biocentre on arable land using pioneer wood species;
- g) Leaving a defined area to spontaneous succession of herb and wood species layer;
- h) Leaving a defined area to controlled succession of herb and wood species layer.

With respect to the TSES design process, biocentres and biocorridors can be classified as existing (functional) and proposed (required).

5.7. Horizontal Integration

Because the Supra-regional and Regional (=Sub-national TSES documentation has been elaborated at the central (= national) level (BÍNOVÁ & CULEK 1996) and has been an obligatory background for designing the local TSES (cf. MADĚRA & ZIMOVÁ 2004), there has been the joint TSES framework for the whole country's territory and the tool how to ensure the TSES multi-level hierarchy. Nevertheless, because there has not been up-dated SR-TSES plan available and some Regional Authorities have made changes in the SR_TSES plan although they are not authorised to do without approval of the Ministry of the Environment, in some regions, the TSES plans are not linked to those in neighbouring regions. Similarly to other TSES establishing issues, the most serious problems have been raised at the local level, because some local TSES design are of low quality, *i.e.* not connected to neighbouring local TSES designs caused by the lack of communication between adjacent municipalities.

5.8. Vertical Integration

5.8.1. With EU Level Policies and Instruments

The coherence of the European Community's Natura 2000 network has been recently debated also from a point of view of possible connectivity of its sites (KETTUNEN *et al.* 2007). Article 10 of the Habitats Directive says that Member States should encourage the management of features also outside the Natura 2000 network which can serve as connecting links between the particular sites. In the Czech Republic, there is only little overlap between the TSES and Natura 2000 network, mostly because of different aims and purposes of both the networks. Nevertheless, in cases where linking the particular Natura 2000 sites will bring benefits to the particular wildlife species, the TSES can be used as a connecting tool (ROTH 2005).

5.8.2. With Pan European Level Policies and Instruments

5.8.2.1. The Pan-European Ecological Network (PEEN) in the Czech Republic

Contrary to the three levels of the Territorial System of Ecological Stability (TSES), there are no legal tools for the establishment of the proposed Pan-European Ecological Network in the Czech Republic. Nevertheless, most of the CZ-EECONET⁴⁷ core areas have been declared as Specially

⁴⁷ In 1993 – 1996, an extensive project entitled *National Nature Plan*, financed by the Dutch Ministry of Agriculture, Nature Management and Fisheries was carried out in Poland, Hungary, in Slovakia and in the Czech Republic. In the Czech Republic, the project was implemented by the IUCN – The World Conservation Country Office (now the IUCN – International Union for Conservation of Nature), the IUCN Project Co-ordination Unit Prague. Since that time, in the Czech Republic the PEEN proposed has been also known at the EECONET (European Ecological Network). In the TSES hierarchy, the PEEN proposal could also be the Provincial (*sensu* biogeographical province) or at the global scale, Biosphere TSES.

Protected Areas⁴⁸. The PEEN concept was included into the *State Nature Conservation and Landscape Protection Programme of the Czech Republic*⁴⁹ (MLČOCH *et al. l.c.*). The PEEN concept, published in 1995, has been considered to be a contribution to the future PEEN under the Pan-European Biological and Landscape Diversity Strategy (PEBLDS).

The PEEN proposal for the Czech Republic includes (BÍNOVÁ *et al.* 1995a, 1995b, KOPECKÁ *et al.* 1995, PLESNÍK 1995, MACKOVČIN *et al.* 2005, 2006):

- a) Keystone (core) areas (= biocentres in the TSES terminology) which concentrate landscapes of national and international importance. Almost all of them overlap with the appropriate SR-TSES biocentres. Their aim is to maintain values of nature and landscape which are part of the Europe's heritage. There are 24 core areas proposed for the whole country. With a few fully explained exceptions, where the area was chosen because of its unique ecosystems as well as of the extraordinary position with respect to corridors, the core areas cover at least 10,000 hectares. It also is supposed that there have been mostly natural succession processes in the core areas proposed.
- b) Corridors – they are considered to be migration and dispersal routes for many wild plant and animal species, connecting the proposed keystone areas designated in the Czech Republic for the PEEN. In the PEEN proposal for the Czech Republic, 9 corridors were delimited.
- c) Special Landscape Management Zones – in line with the approach common in some EU Member States, these are areas where higher landscape values overlap with other functions of an area (areas of natural and artificial water accumulation, parts of river watersheds, parts of areas protecting natural mineral springs, *etc.*) The compromise will respect both the public interest and interests of individual owners and requires consideration to be given to activities carried out by individual owners in the public interest. In addition, subsidies from European Community programmes, e.g. from agro-environmental schemes, supporting environmentally sound agricultures practices, would be allocated there. In total, 250 Special Landscape Management Zones were proposed for the Czech Republic.

The keystone (core) areas of the PEEN proposal for the Czech Republic cover 361,300 hectares (*i.e.* 4.6 % of the whole country's territory). The Special landscape Management Zones were proposed on 1,827,800 hectares, thus covering 23.2 % of the Czech Republic's territory – BÍNOVÁ *et al.* 1995a, 1995b).

For the identification of the PEEN elements in the Czech Republic, the TSES concept had been applied with some slight modifications. Namely, the Supra-regional TSES was the background source for identifying them. The PEEN corridors in the Czech Republic are almost identical with those in the SR-TSES. The methodological difference is the delimitation of buffer zones for core areas (= biocentres, keystone areas) and of Special Landscape Management Zones, because they do not exist in the SR-TSES (BÍNOVÁ *et al.* 1995a, 1995b).

Most of the PEEN elements in the Czech Republic overlap with Specially Protected Areas under Act No. 114/1992 Gazette on the Protection of Nature and the Landscape, particularly with National Parks, Protected Landscape Areas, National Nature Reserves and National Nature Monuments). Special Landscape Management Zones overlap with areas with other important non-productive functions of the landscape: in addition to Specially Protected Areas also marginal, Less Favourable Areas (LFAs).

5.8.3. With Global Level Policies and Instruments

The TSES has been included in the main document for implementing the Convention on Biological Diversity in the country – *National Biodiversity Strategy of the Czech Republic* (MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC 2005), namely in the chapters dealing with territorial protection as well as with spatial planning and regional development.

⁴⁸ Act No. 114/1992 Gazette on the Protection of Nature and the Landscape

⁴⁹ as Annexes XIVA & XIVb, adopted by the Government of the Czech Republic by its decision No. 415 of 17 June, 1998

Due to the above criteria, some biocentres of the Supra-regional TSES are at the same time UNESCO Biosphere Reserves or Ramsar Sites (Wetlands of International Importance (under the Convention on Wetlands of International Importance, especially as Waterfowl Habitat, Ramsar Convention)).

6 Integrating Spatial Planning and Ecological Networks: Interactions, Synergies and Barriers

6.1. Policy Interactions of Spatial Planning and Ecological Networks Integration

6.1.1. Current status of implementing the TSES in the Czech Republic

6.1.1.1. Supra-regional Territorial System of Ecological Stability (SR TSES)

In the Czech Republic, there are 109 supra-regional biocentres of the TSES, which represent 89 individual biogeographical units (bioregions) and 14 unique biocentres of the Central European significance (BÍNOVÁ & CULEK 1996). According to the most recent data, in total, the supra-regional biocentres cover 222,254 hectares (*i.e.* 2.87 % of the whole country's territory), while supra-regional corridors with buffer zones cover 2,332,427 hectares (29.0 % of the country – MACKOVČIN *et al.* 2006). The numbers given above do not mean that the area is strictly protected by the law, but is under general protection under Act No. 114/19952 on the Protection of Nature and the Landscape (see above).

The Supra-regional TSES includes most of the internationally significant conservation areas in the Czech Republic. In addition to the other information sources, it has been used for improving the Specially Protected Areas in the country.

The Supra-regional TSES was the background source for identification of the European Ecological Network (PEEN); components in the Supra-regional TSES were the background source for identification of the European Ecological Network (PEEN) components in the Czech Republic in 1996 (see below). The EECONET-CZ corridors are almost identical with those in the SR-TSES. The methodological difference is the delimitation of buffer zones for core areas and of Special Landscape Management Zones, because they do not exist in the SR-TSES.

The SR-TSES GIS layers include both supra-regional biocentres and supra-regional biocorridors and their buffer zones⁵⁰.

6.1.1.2. Regional (e.g. Subnational) Territorial System of Ecological Stability (R TSES)

The regional biocentres cover 289,547 hectares (*i.e.* 3.6 % of the whole country's territory) and regional corridors with buffer zones cover 297,205 hectares (3.8 % of the country – MACKOVČIN *et al.* 2006.).

The R-TSES GIS layers include both regional biocentres and regional biocorridors and their buffer zones⁵¹.

6.1.1.3. Local Territorial System of Ecological Stability (L- TSES)

The information on area, lengths and coverage are available only on part of the Czech Republic territory and rarely in digital format. The L-TSES are mapped on the scale 1: 2 000 to 1: 25 000⁵². Only some L-TSES designs have been digitalized.

⁵⁰ mapping scale 1: 50 000, projection and projection parameters: S-JTSK – Krovak – East – North

⁵¹ mapping scale 1: 50 000, projection and projection parameters: S-JTSK – Krovak – East – North

⁵² projection and projection parameters used S-JTSK – Krovak – East – North and GCS_Pulkovo_1942

6.2. Process Interactions of Spatial Planning and Ecological Networks Integration

As has been repeatedly stressed above, the Czech Republic is among the European countries where establishing and managing ecological networks at various spatial scales have been included in the nature conservation and landscape management legislation. In addition, the issue has also been included into the country's spatial planning legislation, *i.e.* the Building Act. From a point of view of spatial planning, the TSES is one of the natural limits of land use within the particular territory, which has to be identified and taken into account during the spatial planning procedure. Therefore, the TSES acquires a general obligatory character within the process of approving land-planning documentation. In practice, the ecological network should also be considered when elaborating proposals for comprehensive land consolidation/re-plotting and Forest Management Plan (basic forest management planning tools for both governmental and private owners).

6.3. Synergies/Opportunities of Spatial Planning and Ecological Networks Integration

As repeatedly stressed in this report, from a legal point of view the TSES concept is not only an issue of the State Nature Conservancy, but at same time also the obligatory background for decisions on land-use within the particular territory. Nevertheless, there are still barriers to spatial planning and TSES integration as presented below in more detail.

6.4. Barriers to Spatial Planning and Ecological Networks Integration

Barriers to spatial planning and ecological networks integration in the Czech Republic include:

- 1) Barriers within the State Nature Conservancy and more generally, environment protection sector
Some State Nature Conservancy authorities have strongly preferred designing, establishing and managing the Specially Protected Areas under Act No. 114/1992 Gazette on the Protection of Nature and the Landscape, as amended later. Less attention is being paid by them to the parts of landscape generally protected under the above Act, incl. TSES elements.
- 2) Barriers within the spatial planning and regional development sectors
Licences for TSES designers are not issued by the State Nature Conservancy authorities but by the Chamber of Architects. Therefore, in some case, despite the very sophisticated methodology, the local TSES design is made without the appropriate knowledge of the area concerned.
- 3) Barriers within the communication between both sectors
In the Czech Republic, there have been still traditional strong barriers among the particular sectors: in many cases, inter-personal relations can solve the common problems more effectively and earlier than official negotiations between the particular sectors.
- 4) Barriers within the public administration
For various reasons, municipalities have not been able to elaborate high-quality background documents for the local TSES to be included into spatial planning process (see above). Therefore, local TSES are the weakest part of TSES system in the Czech Republic.
- 5) Other barriers
Although the TSES concept was formulated in the former Czechoslovakia in the late 1970s and early 1980s, there still has been only low awareness of the general public of the role, importance and benefits of the multi-lateral ecological network in the landscape. Raising public awareness of the TSES and ecological network generally has been carried out particularly by NGO, *e.g.* by the Czech Union for Nature Conservation (Veronica Ecological Institute Brno).

From a scientific point of view, due to some controversies, particularly with respect to efficiency of ecological corridors for supporting or improving landscape connectivity, some scientists have expressed their serious doubts on the real importance of ecological networks for maintaining both biological diversity and life-supporting processes in ecosystems. Some other experts argue that the variability of conditions in the current landscape including that caused by human interventions does not allow applying the single, although sophisticated methodology for establishing the TSES. Therefore, the ecological network itself is very often considered as only paper- or computer work.

For more details on implementing various TSES level in practice, see LACINA 2002, PETROVÁ 2003, 2006, 2007, PETROVÁ & MATUŠKA 2004, 2005.

7 Conclusions and recommendations

- i. The TSES concept has been included in most national policy documents dealing with sustainable development, environmental protection, nature conservation and landscape management (see above).
- ii. The main strengths of the TSES concepts can be described as follows:
 - a) The TSES concept has been included into Act. No. 114/1992 Gazette on the Protection of Nature and the Landscape, as amended later, as well as into the appropriate implementing legal tools (Decree of the Ministry of the Environment No. 395/1992 Gazette, as amended later);
 - b) The TSES has also become a part of the country's spatial planning legislation (Act No. 183/2006 Gazette on Urban and Country Planning and Building Code, the Building Act). Therefore, it becomes general obligatory character within the process of approving land-planning documentation;
 - c) Spatial planners are willing to allocate some lands for the purpose of nature conservation and landscape protection as they have done for *e.g.* linear features, transport infrastructure development, *etc.*
 - d) The TSES concept can be understood by spatial planners and economists if it includes quantitative, measurable parameters/features which can be identified in the field.
 - e) Newly established elements of an ecological network are almost always, from a point of view of nature conservation and environmental protection, of higher quality than the previous ones (*e.g.* local forest corridor through arable land).
- iii. The main shortcomings in TSES designation and implementation in the Czech Republic include:
 - a) Absent or outdated spatial planning documentation in a number of small municipalities. It is estimated that 60 % of the L-TSES plans were elaborated on the basis of the MR-TSES from 1990. Therefore, even after 15 years, there have not been up-dated, high-quality TSES plans for the whole territory of the country;
 - b) Inadequate mechanisms for conservation and restoration of the composing elements of TSES at all its levels;
 - c) The slow rate of land replotting/land consolidation reducing the potential for implementation of TSES;
 - d) Low quality in drawing up basic land-use planning documents for the general specifications of the local TSES which reduces and limits their use in the spatial planning documentation and consequently, causes low accessibility of the general specifications. In addition, most of the local TSES plans had been elaborated according to the previous methodology, which has been replaced by the new one;
 - e) Conflicts with TSES elements occur in planning and implementation of linear structures, without ensuring the corresponding technical solution of this conflict in all cases, although the detailed methodology has been elaborated and published a technical standard by the Ministry of Transport of the Czech Republic and Road and Motorway Directorate (MINISTRY OF TRANSPORT OF THE CZECH REPUBLIC 2006):
 - f) Spatial planning does not deal with land use based on ecological carrying capacity of the ecosystems or landscapes for the given types of economic activities and development. Moreover, the concept of carrying capacity has been included in the Building Act by defining minimum limits of the given area, including from a point of view of environmental quality;
 - g) Use of non-built-up areas is sometimes only formally elaborated within the spatial planning documentation. Different emphasis is placed on non-built-up and built-up areas;
 - h) Rich experience in TSES designation and implementation in the Czech Republic has not been summarized yet. Some key methodological documents and outputs of the process are still available in Czech only (see References below);
 - i) Effective management of TSES components needs close collaboration between the State Nature Conservancy authorities and land owners, particularly in the efforts to secure long-term financing for land management. Therefore, the State Nature Conservancy staff has to communicate with land-owners on a regular basis;

- j) The Building Act gives to the Government the first option for purchasing the lands forming TSES components at various levels: also from this reason, high-quality TSES plans are needed to be available for the whole country.
- iv. A more in-depth approach to landscape planning is lacking. The European Landscape Convention has not yet been fully integrated into the legal, administrative and economic documents of the Czech Republic.
- v. Methodology on the unification of approaches to the TSES designing and implementing at all levels should be urgently developed and approved by the appropriate authorities, particularly after the enforcement of the Building Act.

8 References

- BENNETT G. & MULONGOY K.J. (2006): Review of experience with ecological networks, corridors and buffer zones. Secretariat of the Convention on Biological Diversity Montreal, 100 pp.
- BÍNOVÁ L., CULEK M. & MÍCHAL I. (1995a): Evropská ekologická síť v České republice (koncept, srpen 1995) (The European Ecological Network in the Czech Republic. An outline, August 1995). The Society for the Environment Brno and IUCN – the World Conservation Union Project Coordination Unit Prague, 31 pp. (In Czech)
- BÍNOVÁ L., CULEK M., KOPECKÁ V., MÍCHAL I. & PLESNÍK J. (1995b): Evropská ekologická síť – možný podíl České republiky (The European Ecological Network – a possible contribution of the Czech Republic). *Ochrana přírody* 50: 141-146 (In Czech, with English summary).
- BÍNOVÁ L. & CULEK M. (1996): Územně technický podklad pro nadregionální a regionální územní systém ekologické stability ČR (The Territorial Technical Document of the Supra-Regional and Regional Territorial System of Ecological Stability of the Czech Republic). Agency for the Environment Brno (In Czech).
- BOITANI L., FALCUCCI A., MAIORANO L. & RONDININI C. (2007): Ecological networks as conceptual frameworks or operational tools in conservation. *Conserv. Biol.* 21: 1414-1422.
- BONNIN M., BRUSZIK A., DELBAERE B., LETHIER H., RICHARD D., RIENTJES S., VAN UDEN G. & TERRY A. (2007): The Pan-European Ecological Network: Taking stock. Council of Europe Publ. Strasbourg. 116 pp.
- BROŽOVÁ J. ed. (2004): Biologická rozmanitost: současný stav a trendy (Biological diversity in the Czech Republic: current state and trends). Ministry of the Environment of the Czech Republic Prague, 58 pp. (In Czech).
- BUČEK A. & LACINA J. (1996): Supra-regional territorial system of landscape ecological stability of the former Czechoslovakia. *Ekológia* 15: 71-76.
- BUČEK A., LACINA J. & LÖW J. (1986): Územní systémy ekologické stability krajiny (Territorial Systems of Ecological Stability of the Landscape). *Životné prostredie* 20 (2): 82-86 (In Czech, with English, Russian and German summaries).
- BUČEK A., LACINA J. & MÍCHAL I. (1996): An ecological network in the Czech Republic. Veronika Brno, 44 pp.
- CENIA (2007): Zpráva o životním prostředí České republiky v roce 2006 (Report on the environment of the Czech Republic). CENIA, Czech Environmental Information Agency Pratur, 223 pp. (In Czech).
- CZECH GOVERNMENT COUNCIL FOR SUSTAINABLE DEVELOPMENT (2004): The Czech Republic Strategy for Sustainable Development. Czech Government Council for Sustainable Development Prague. 63 pp.
- DÍAS P.C. (1996): Sources and sinks in population biology. *Trends Ecol. Evol.* 11: 326-329.
- FARINA A. (1998): Principles and methods in landscape ecology. Chapman & Hall London, 235 pp.
- FORMAN R.T.T. (1995): Land mosaics. The ecology of landscapes and regions. Cambridge University Press Cambridge, 632 pp.
- FORTIN M..J. & DALE M. (2005): Spatial analysis: A guide for ecologists. Cambridge University Press Cambridge, 365 pp.
- FRANKHAM R. (2003): Genetics and conservation biology. *CR Biologies* 326: S22-S29.
- FRANKHAM R., BALLOU J.D. & BRISCOE D.A. (2002): Introduction to conservation genetics. Cambridge University Press Cambridge, 640 pp.
- HALASOVÁ H. & ŠILAROVÁ V. (2007): Town and country planning in the Czech Republic 2007. Ministry of Regional Development Prague and Institute of Spatial Development Brno, 37 pp.
- HANSKI I. (1998): Metapopulation dynamics. *Nature* 396: 41-49.
- HANSKI I. (1999): Metapopulation ecology. Oxford University Press Oxford, 328 pp.
- HANSKI I. & GAGGIOTTI O. eds. (2004): Ecology, genetics and evolution of metapopulations. Elsevier/Academic Press London, 696 pp. + xix.
- HILTY J.A., LIDICKER jr. W.Z. & MERENLENDER A.M. (2006): Corridor ecology: The science and practice of linking landscapes for biodiversity conservation. Island Press Washington, D.C., 324 pp.
- JONGMAN R.H.G., KÜLVIK M. & KRISTIANSEN I. (2004): European ecological networks and greenways. *Landscape Urban Plann.* 68: 305-319.
- KETTUNEN M., TERRY A., TUCKER G. & JONES A. (2007): Guidance on the maintenance of landscape features of major importance for wild flora and fauna. Guidance on the implementation of Article 3 of the Birds Directive (79/409/EEC) and Article 10 of the Habitats Directive (79/409/EEC). Institute for European Environment Policy Brussels, 114 pp- + lii.
- KOPECKÁ V., MÍCHAL I. & PLESNÍK J. (1995): Krajina očima ekologů. Hledání klíčů od domova pro příští tisíciletí (The landscape as seen by ecologists. Seeking for the keys from home for the next millennium). *Vesmír* 75: 223-224 (In Czech).

- KUBEŠ J. (1996): Biocentres and corridors in a cultural landscape. A critical assessment of the "territorial system of ecological stability". *Landscape Urban Plan.* 35:231-240.
- LACINA D. ed. (2002): ÚSES zelená páteř krajiny I. (TSES – A Green Backbone of the Landscape, vol. I). Conference Proceedings, Agency for Nature Conservation and Landscape Protection of the Czech Republic and Mendel University of Agriculture and Forestry Brno, 100 pp. (In Czech).
- LEVINS R. (1969): (1969): Some demographic and genetic consequences of environmental heterogeneity for biological control. *Bull. Entomol. Soc. Am.* 15: 237–240.
- LEVINS R. (1970): Extinction. In GESRENHABER M. (ed.): Lectures on mathematics in the life sciences, vol. 2. Am. Math. Soc. Providence, Rhode Island: 77-107.
- LÖW J. et al. (1995): Rukověť projektanta místního systému ekologické stability. Metodika pro zpracování dokumentace (Manual for designers of the Local Territorial System of Ecological Stability. Methods for elaboration of the documentation). *Doplňk Brno*, 285 pp. (In Czech).
- LÖW J. & MÍCHAL I. (2003): Krajinný ráz (Landscape scenery). Institute of Applied Ecology, Czech University of Life Sciences and Lesnická práce Publ. House Kostelec n. Č. lesy, 552 pp. (In Czech, with English summary).
- MA (2005): Ecosystems and human well-being: Synthesis. Island Press Washington, D.C., 137 pp. + x.
- MACARTHUR R.H. & WILSON E.O. (1967): The theory of island biogeography. Princeton University Press Princeton, NJ, 203 pp.
- MACKOVČIN P. (2000): A multi-level ecological network in the Czech Republic. Implementing the Territorial System of Ecological stability. *GeoJournal* 51: 211-220.
- MACKOVČIN P., PETŘÍČEK V. & PLESNÍK J. (2005): Ecological networks in the Czech Republic. Commissioner General Office for the Participation of the Czech Republic at the World Exposition EXPO 2005 (Aichi, Japan) Prague, 46 pp.
- MACKOVČIN P., MATUŠKA P., PETROVÁ A. & PLESNÍK J. (2006): National Report on the Implementation of the Pan-European Ecological Network. The Czech Republic. Agency for Nature Conservation and Landscape Protection of the Czech Republic Brno and Prague, 15 pp.
- MADĚRA P. & ZIMOVÁ E. eds. (2004): Metodické postupy projektování lokálního ÚSES. (Methodological guidance for developing local TSES). Mendel University of Agriculture and Forestry and Löw a spol. Brno. CD-ROM.
- MÍCHAL I. & PLESNÍK J. (2005): Mezinárodní aspekty tvorby územních systémů ekologické stability (International aspects of the concept of the Territorial System of Ecological Stability). *Ochrana přírody* 50: 134-140 (In Czech, with English summary).
- MIKLOS L. (1989): The general ecological model of the Slovak Socialist Republic – methodology and contents. *Landscape Ecol.* 3: 43-51.
- MINISTRY OF AGRICULTURE OF THE CZECH REPUBLIC (2004): Zpráva o zemědělství v roce 2004. "Zelená zpráva". Ministry of Agriculture of the Czech Republic Prague, 176 pp. (In Czech).
- MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC (2004): Státní politika životního prostředí 2004-2010. (State Environmental Policy of the Czech Republic 2004-2010). Ministry of the Environment of the Czech Republic Prague, 60 pp.
- MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC (2005): Strategie ochrany biologické rozmanitosti České republiky (National Biodiversity Strategy of the Czech Republic). Ministry of the Environment of the Czech Republic Prague, 137 pp. + cxxix.
- MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC/CZECH STATISTICAL OFFICE/CENIA, CZECH ENVIRONMENT AGENCY (2007): Statistická ročenka životního prostředí 2006. Statistical Environmental Yearbook of the Czech Republic 2006. Ministry of the Environment of the Czech Republic/Czech Statistical Office/CENIA, Czech Environment Agency Prague, 637 pp. (In Czech and English).
- MINISTRY OF TRANSPORT OF THE CZECH REPUBLIC (2006): Assessment of territorial permeability for linear constructions. Technical standard. Ministry of Transport of the Czech Republic and Road and Motorway Directorate Prague & Evernia Prague, 36 pp.
- MLČOCH S., HOŠEK J. & PELC F. eds. (1998): Státní program ochrany přírody a krajiny ČR. (State Nature Conservation and Landscape Protection Programme of the Czech Republic). Ministry of the Environment Prague, 21 pp. + xxi.
- NAVEH Z. (2001): Ten major premises for a holistic conception of multifunctional landscapes. *Landscape Urban Plann.* 57: 269-284.
- OECD (2005): OECD Environmental Performance Reviews – Czech Republic. OECD Paris, 204 pp.
- OPDAM P., FOPPEN R. & VOS S. C. (2002): Bridging the gap between ecology and spatial planning in landscape ecology. *Landscape Ecol.* 16: 767–779.
- OPRŠAL Z. (2006): The use of GIS in TSES planning. *Acta Univ. Palack. Olomuc. Fac. Rer. Nat. Geogr.* 39: 39-48.
- PELLANTOVÁ J. et al., 1994: Metodika mapování krajiny (The methodology of landscape mapping). The Czech Institute of Nature Protection Prague and Brno, 44 pp. (In Czech).

- PETROVÁ A. ed. (2003): ÚSES zelená páteř krajiny II. (TSES – A Green Backbone of the Landscape, Vol. II). Conference Proceedings, Agency for Nature Conservation and Landscape Protection of the Czech Republic, Mendel University of Agriculture and AGERIS Brno, 99 pp. CD-ROM
- PETROVÁ A. ed. (2006): ÚSES zelená páteř krajiny V. (TSES – A Green Backbone of the Landscape, Vol. V). Conference Proceedings, Agency for Nature Conservation and Landscape Protection of the Czech Republic, Mendel University of Agriculture and AGERIS Brno, 102 pp. CD-ROM
- PETROVÁ A. ed. (2007): ÚSES zelená páteř krajiny VI. (TSES – A Green Backbone of the Landscape, Vol. VI). Conference Proceedings, Agency for Nature Conservation and Landscape Protection of the Czech Republic, Mendel University of Agriculture and AGERIS Brno, 104 pp. CD-ROM
- PETROVÁ A. & MATUŠKA P. eds. (2004): ÚSES zelená páteř krajiny III. (TSES – A Green Backbone of the Landscape, Vol. III). Conference Proceedings, Agency for Nature Conservation and Landscape Protection of the Czech Republic, Mendel University of Agriculture and AGERIS Brno, 98 pp. CD-ROM
- PETROVÁ A. & MATUŠKA P. eds. (2005): ÚSES zelená páteř krajiny IV. (TSES – A Green Backbone of the Landscape, Vol. IV). Conference Proceedings, Agency for Nature Conservation and Landscape Protection of the Czech Republic, Mendel University of Agriculture and AGERIS Brno, 124 pp. CD-ROM
- PICKETT S.T.A. & OSTFELD R.S. (1995): The shifting paradigm in ecology. In KNIGHT R.L. & BATES S.F. (eds.): A new century for natural resources management. Island Press Washington, D.C.: 261–279.
- PICKETT S.T.A., OSTFELD R.S., SHACHA K.M. & LIKENS G.E. eds. (1997): The ecological basis of conservation. Heterogeneity, ecosystems and biodiversity. Chapman & Hall New York London, 466 pp.
- PICKETT S.T.A., PARKER V.T. & FIEDLER P.L. (1992): The new paradigm in ecology: Implications for conservation biology above the species level. In FIEDLER P.L. & JAIN S.K. (eds.): Conservation biology: the theory and practice of nature conservation, preservation, and management. Chapman & Hall London New York: 65–88.
- PLESNÍK J. (1995): Evropská ekologická síť a Česká republika (The European Ecological Network and the Czech Republic). Živa 43: 146–148. (In Czech, with English summary).
- PLESNÍK J. (2004): Biologická rozmanitost v České republice: současný stav, hlavní problémy a perspektivy vývoje (Biological diversity in the Czech Republic: Current state, main issues and prospects). In SECRETARIAT OF THE CONVENTION ON BIOLOGICAL DIVERSITY: Biologická rozmanitost na Zemi: stav a perspektivy (Biological diversity on Earth: State and prospects). Scientia Praha: 197–261 (In Czech).
- PLESNÍK J. (2005): Česká republika se stala smluvní stranou Evropské úmluvy o krajině (The Czech Republic has become a Party to the European Landscape Convention). Ochrana přírody 60: 56–57. (In Czech).
- PLESNÍK J. & STAŇKOVÁ J. eds. (2001): Status of biological resources and implementation of the Convention on Biological Diversity in the Czech Republic. First report. Ministry of the Environment of the Czech Republic Prague, 72 pp.
- PULLIAM H.R. (1988): Sources, sinks and population regulation. Am. Nat. 132: 652–661.
- RICKLEFS R.E. & SCHLUTER D. eds. (1993): Species diversity in ecological communities: historical and geographical perspectives. University of Chicago Press Chicago, 416 pp.
- ROTH P. (2005): Natura 2000 and ecological networks: Could and should ecological networks support implementation of Art. 10? Presentation at the International Workshop "Ecological networks and coherence according to article 10 of the Habitats Directive, 9–13 May 2005, the Isle of Vilm, Germany.
- SELMAN P.H. (2005): Planning at the landscape level. Routledge London, 213 pp.
- SKLENIČKA P. & CHARVATOVA E. (2003): Stand continuity – a useful parameter for ecological networks in post-mining landscapes. Ecol. Engin. 20:287–296.
- SMITH D.S. & HELLMUND P.C. eds. (1993): Ecology of greenways: Design and function of linear conservation areas. University of Minnesota Minneapolis, MN, 222 pp.
- TISCHENDORF L. & FAHRING L. (2000): On the usage and measurement of landscape connectivity. Oikos 90: 7–19.
- UNEP (2003): Protected areas. Addendum. Review of methods and approaches for the planning, establishment and management of protected areas and protected-area network. Secretariat of the Convention on Biological Diversity Montreal, 20 pp.
- WU J. & HOBBS R.J. eds. (2007): Key topics in landscape ecology. Cambridge University Press Cambridge, 314 pp.
- YOUNG A.G. & CLARKE G.M. eds. (2000): Genetics, demography and viability of fragmented populations. Cambridge University Press Cambridge, 438 pp.

9 Annexes

Annex 1 List of national laws dealing with ecological networks in the Czech Republic

1. Main legal tools

- Act No. 114/1992 Gazette on the Protection of Nature and the Landscape, as amended later
- Decree of the Ministry of the Environment of the Czech Republic No. 395/1992 Gazette, as amended later
- Methodological Guidance of the Ministry of the Environment of the Czech Republic No. 600/760/94-009/2490/94 on the Ordering, Developing and Approving the Documentation of a Local Territorial System of Ecological Stability

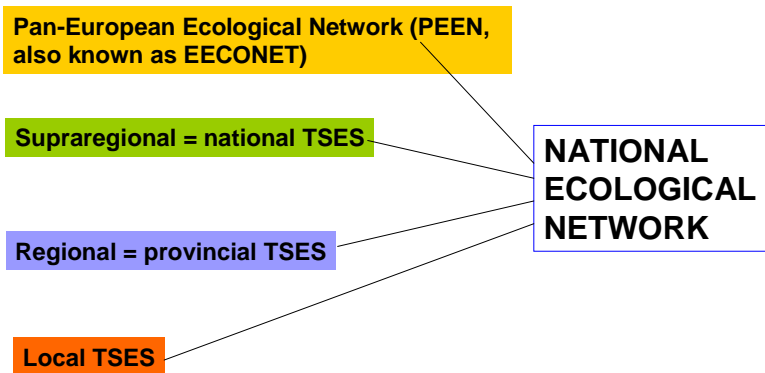
2. A broader legal framework for delimitating and developing the TSES

- a) State Administration
 - Act No. 128/2000 Gazette on Municipalities, as amended later
 - Act. No. 131/2000 Gazette on Prague, the Capital of the Country, as amended later
 - Act No. 129/2000 Gazette on Regions, as amended later
 - Act No, 314/2002 Gazette Listing the Municipalities with Extended Competences and Municipalities with Authorized Local Government
- b) Land-use/spatial planning
 - Act No. 183/2006 Gazette on Urban and Country Planning and Building Code (the Building Act)
 - Ministry of Regional Development of the Czech Republic Decree No. 500/2006 Gazette on Planning Analytical Materials, Planning Documentation and Ways of Planning Activities Filing
 - Ministry of Regional Development of the Czech Republic Decree No. 501/2006 Gazette on General Territorial Management Requirements
- c) Environmental protection and management incl. EIA
 - Act No. 17/1992 on the Environment
 - Act No. 244/1992 Gazette on Environmental Impacts Assessment of Strategies, Policies and Programmes, as amended later
 - Act No. 100/2001 Gazette on Environmental Impact Assessment, as amended later
- d) Farmland management and land re-plotting/consolidation
 - Act No. 139/2002 Gazette on Land Replotting/Consolidation and Land Offices, as amended later
 - Decree of the Ministry of Agriculture of the Czech Republic No. 545/2002 Gazette on the Process of Land Replotting/Consolidation Implementation
- e) Forest management
 - Act No. 289/1995 Gazette on Forests, as amended later
 - Decree of the Ministry of Agriculture of the Czech Republic No. 84/1996 Gazette on Forest Management Planning
 - Decree of the Ministry of Agriculture of the Czech Republic No. 55/1999 Gazette on the Means of Calculating the Extent of Loss or Damage caused to Forests
- f) Water management
 - Act No. 254/2001 Gazette on Waters, as amended later
 - Decree of the Ministry of Agriculture of the Czech Republic No. 92/2002 Gazette on River Basins/Catchment Areas
 - Decree of the Ministry of Agriculture of the Czech Republic No. 431/2003 Gazette on Water Management Planning
- g) Licensing authorities
 - Act No. 360/1992 Gazette on Practices of Profession of the Authorized Architects and of the Authorized Building Engineers and Technicians, as amended later
 - Internal Rules of the Czech Chamber of Architects

Annex 2 Hierarchy of the ecological network in the Czech Republic



HIERARCHY OF THE ECOLOGICAL NETWORK IN THE CZECH REPUBLIC



Annex 3 List of acronyms

EIA:	Environmental Impact Assessment
ESPN:	European Spatial Planning Observation Network
ESDP:	European Spatial Development Perspective
NGO:	Non Governmental Organisation
TSES:	Territorial System of Ecological Stability