

# CONCEPT OF ECOLOGICAL NETWORK - ESTONIAN EXPERIENCES

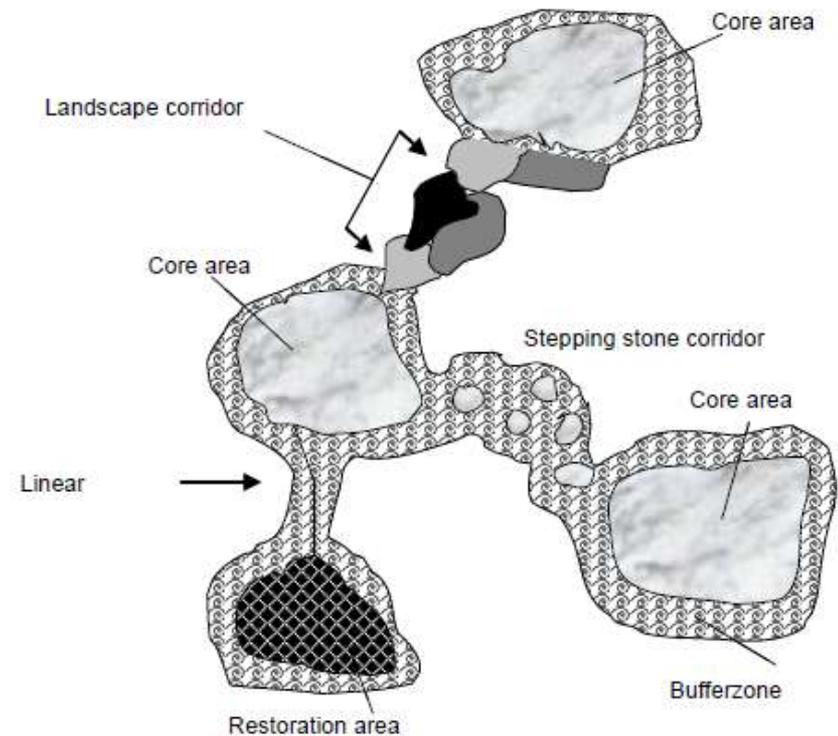
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# BACKGROUND: THE ECOLOGICAL NETWORKS CONCEPT

- Ecological networks' main goal is to conserve biodiversity by **maintaining** and **strengthening** the **integrity** of ecological and environmental processes; and
- To counter the above effects by linking **fragmented ecosystems** with each other in order to promote exchange between populations of species and to enable the migration and spread of species

# BACKGROUND: THE ECOLOGICAL NETWORKS CONCEPT

- Ecological networks are based around the idea of **core areas**, **ecological corridors**, **buffer zones** and **restoration areas**
- They are designed and managed in such a way as to preserve biological diversity and to **maintain or restore ecosystem services** through the **interconnectivity** of its physical elements within the landscape



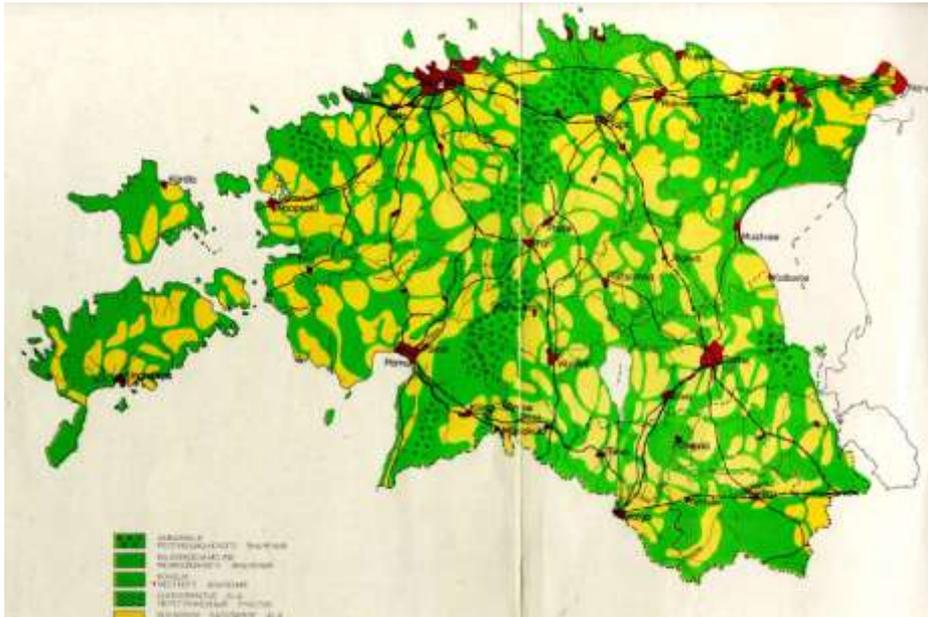
# BACKGROUND: HISTORY, THEORETICAL ROOTS

- The analysis of the theoretical roots of the Estonian ecological network concept demonstrates the relation between the contemporary approaches and **the classical theories of geography** (the Central Place Theory von Thünen, Christaller, and Lösch)
- In **1970s Rodoman** has used the idea of influence pattern and spatial hierarchy for developing the concept of polarized landscapes. Rodoman's system, now known as the eco-stabilizing approach to ecological networks

# BACKGROUND: HISTORY

- The concept of ecological networks is not new; the model has developed over the **past 35-40 years**
- Beginning in the 1970s and 1980s in countries where **a strong land use planning tradition** had created the institutional environment for allocating functions at the landscape scale in the context of increasingly fragmented European landscapes
- The **concept** is the translation of ecological knowledge on fragmentation processes in the landscapes of Europe and its consequences for populations of natural species

# SPATIAL PLANNING, 1983, NETWORK OF COMPENSATING AREAS AT SCALE 1: 200 000



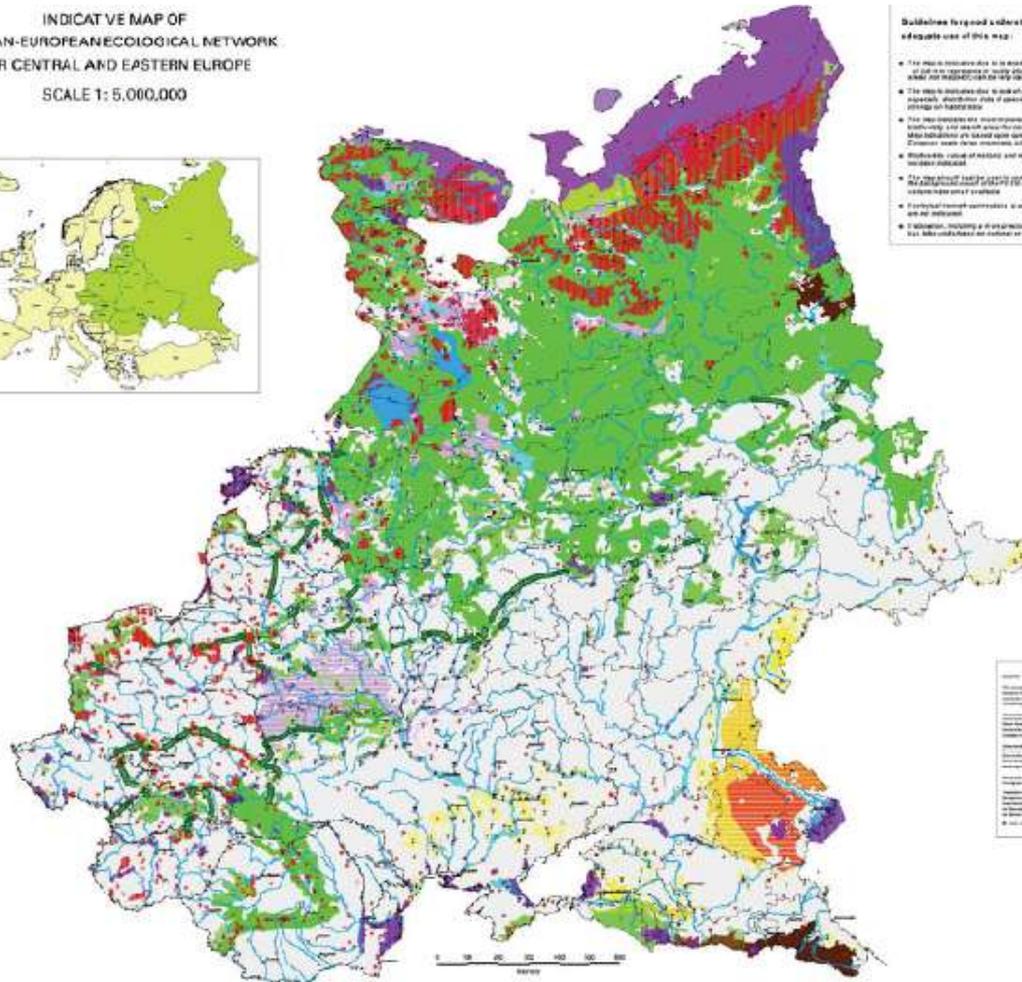
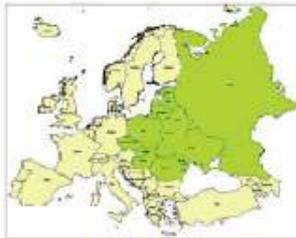
# BACKGROUND - POLITICAL

- By adopting the [Pan-European Biological and Landscape Diversity Strategy](#) in 1995, the development of ecological networks (the Pan-European Ecological Network) became the priority nature conservation strategy in Europe
- The [Sixth Ministerial Conference "Environment for Europe"](#) in Belgrade in 2007 represented a watershed for the development of a Pan-European Ecological Network

# BACKGROUND - POLITICAL

- Developing **ecological connectivity** is one of the recommendations of the **CBD Conference** of the Parties in Nagoya (Japan) in October 2010
- **Green infrastructure** has emerged as a priority within the Communication from the European Commission (2011): *Our life insurance, our natural capital: an EU biodiversity strategy to 2020*

INDICATIVE MAP OF  
THE PAN-EUROPEAN ECOLOGICAL NETWORK  
FOR CENTRAL AND EASTERN EUROPE  
SCALE 1:5,000,000



- Guidelines for good understanding and adequate use of this map:**
- The map is indicative and is to be used for general information purposes only. It does not constitute a legal document or a basis for any legal action.
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Legend
Green: Core areas
Yellow: Buffer zones
Blue: Water bodies
Red: High priority areas
Purple: Special areas of conservation
Grey: Urban areas
Black: National borders
Blue lines: Major rivers
Black lines: National roads
Black lines: Railway lines
Black lines: International borders
Black lines: Administrative boundaries
Black lines: District boundaries
Black lines: County boundaries
Black lines: Municipal boundaries
Black lines: Village boundaries
Black lines: Settlement boundaries
Black lines: Other boundaries

LEGEND

SCALE 1:5,000,000

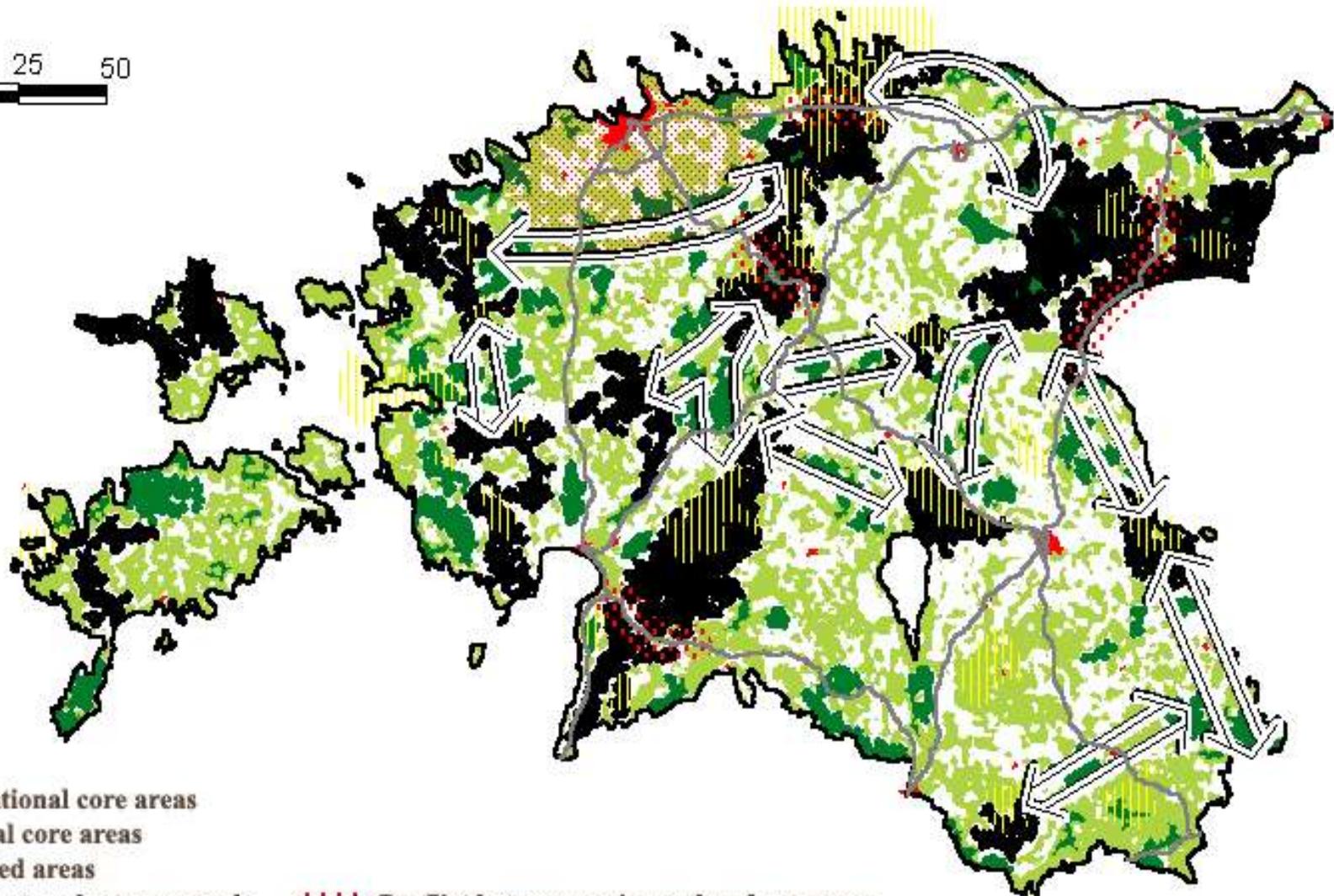


# GREEN NETWORK IN ESTONIA

- Since the mid of 1990s we have a legislative and political support for ecological network applications (Act on Building and Planning, 1995, Act on Planning, 2002)
  - State level
  - County level
  - Municipality level
- The long-term National spatial strategy “Estonia – Vision 2010” included the “Green Network” chapter and also Vision 2030 will include themes related to Green Infrastructure.

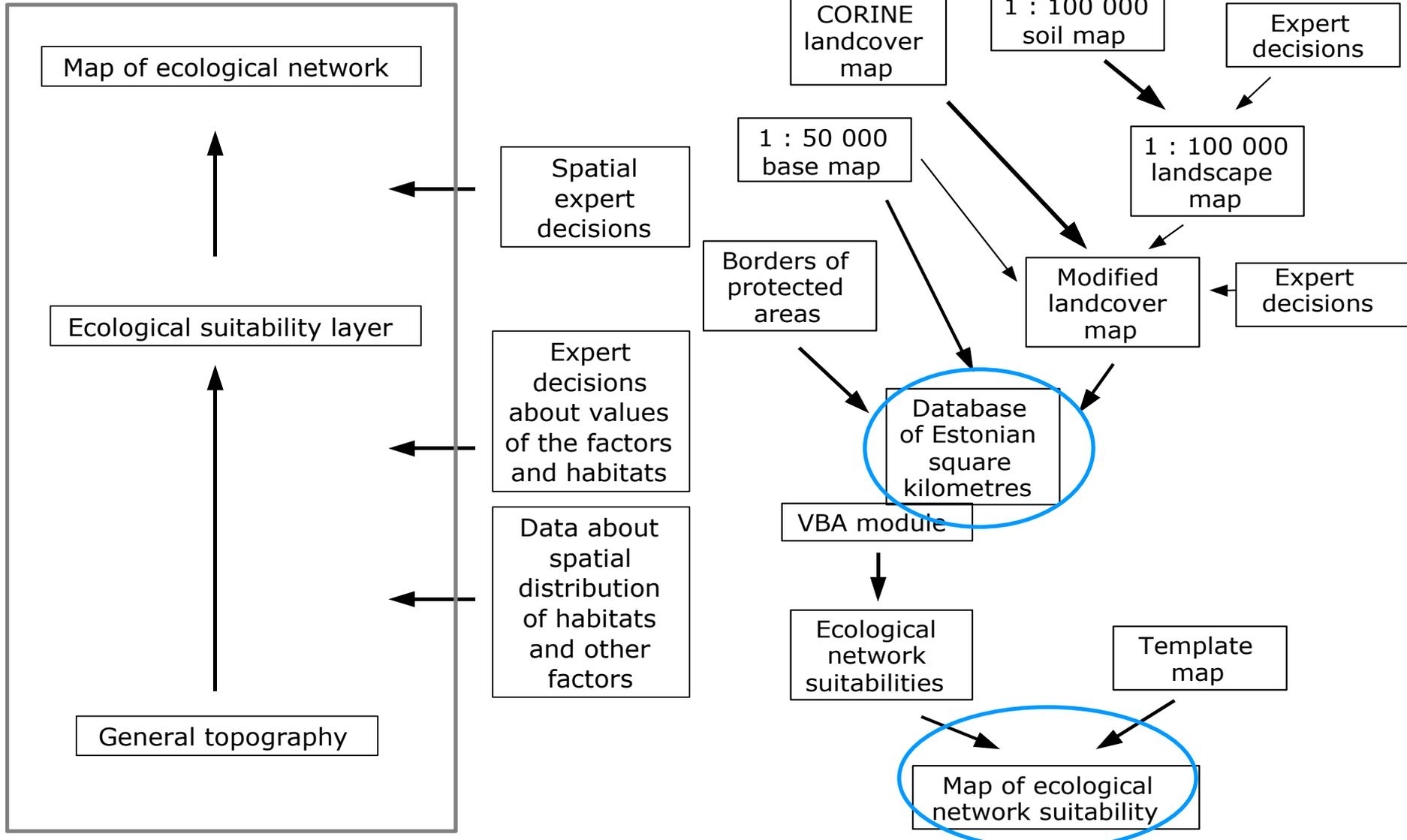
# ESTONIAN "GREEN NETWORK" ACCORDING TO "ESTONIA - VISION 2010"

## ESTONIA 2010 GREEN NETWORK



-  International core areas
-  National core areas
-  Protected areas
-  Green network at meso scale
-  Conflict between main road and core area
-  Areas with high human impact
-  Main green corridors

**PRINCIPAL LAYERS OF A NETWORK MAP (LEFT) AND  
SOURCE DATA FOR CALCULATING ECOLOGICAL SUITABILITY LAYER OF THE MAP OF  
ESTONIAN ECOLOGICAL NETWORK** (VBA – MicroSoft Visual Basic for Applications)



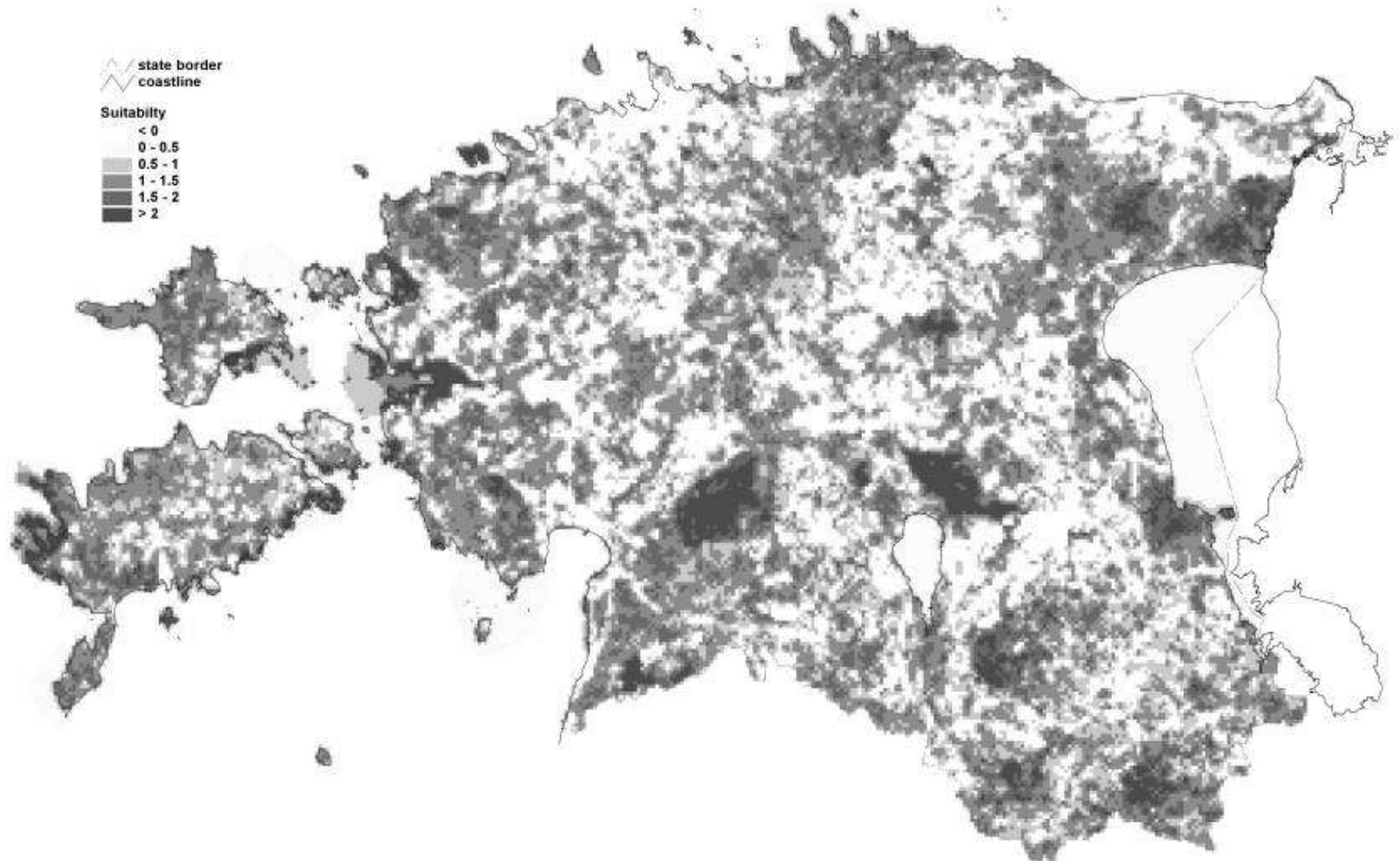
# ECOLOGICAL NETWORK VALUES OF HABITATS (LANDCOVER CLASSES) IN ESTONIA

• Constructions	0.01
• Peat extraction sites	0.05
• Suburban areas	0.1
• Fields	0.2
• Complex cultivation	0.3
• Plantations	0.4
• Wooded agricultural land	0.6
• Scrubs	0.9
• Sparse vegetation	1.0
• Inland water bodies	1.2
• Coniferous forest on peat	1.3
• Heath	1.4
• Other grasslands	1.5
• Broad leaved and mixed forests on peat	1.8

• Coastal lagoons	1.9
• Coniferous forests on mineral soil	2.0
• Salt marshes	2.2
• Bogs	2.4
• Moist grasslands	2.6
• Broad-leaved and mixed forests on mineral soil	3.0
• Wooded fens and bogs	3.4
• Riparian zones	3.5
• Littoral marshes	3.6
• Fens	4.0
• Coastal dunes	4.5
• Inland dunes	5.0
• Boreal coastal meadows	6.0

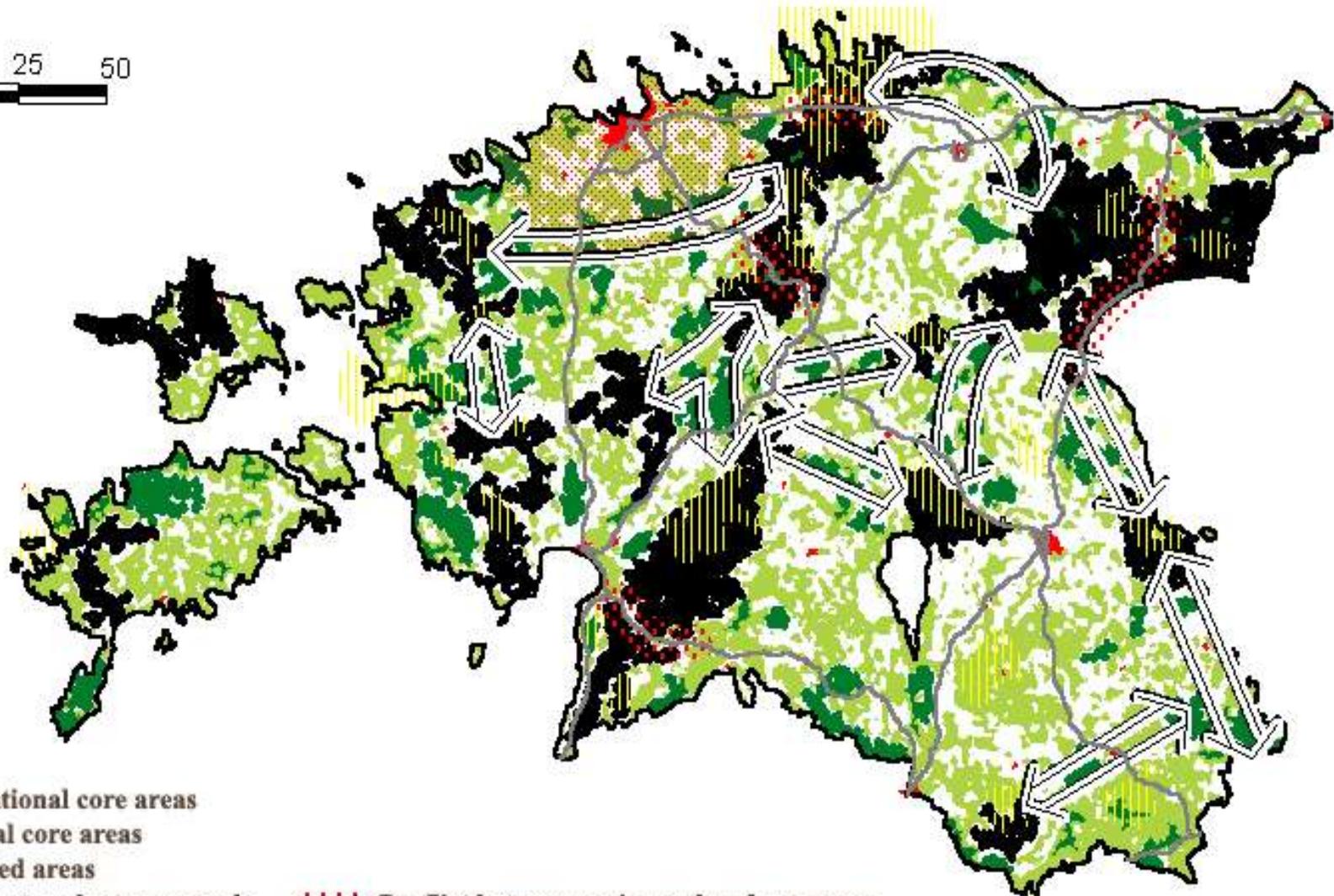
# ECOLOGICAL NETWORK VALUES OF THE DENSITY OF LINEAR FEATURES

# SUITABILITY AREAS FOR THE ECOLOGICAL NETWORK IN ESTONIA



# ESTONIAN "GREEN NETWORK" ACCORDING TO "ESTONIA - VISION 2010"

## ESTONIA 2010 GREEN NETWORK



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-  Main green corridors

# LEGISLATION AND ADMINISTRATION

- The Governmental decree for second phase of county planning (1999-2004) “Defining environmental conditions for the development of land-use and settlement structure”
  - Green Network
  - Valuable cultural and historical landscapes
- Responsible unit: Department of Strategy and Planning, MoE, since 2004 in Mol
- We have a detailed [methodology](#) for defining green network at county level (Jagomägi, Sepp 2002)

# PURPOSES OF DESIGNING OF GREEN NETWORK

- The objective of planning the green network on the county level is not to define a large-scale 'green surface' and leave it out of use, but, first and foremost, to guarantee the naturally, environmentally, socio-economically grounded space structure, based on the location of **different infrastructures** and needs analysis of society
- To complete functionality of the network of protected areas, connecting them into a complete system with natural areas

# PURPOSES OF DESIGNING OF GREEN NETWORK

- According to the Estonian Spatial Plan the Green Network is a coherent system of extensively-used areas in a comparatively good natural state that helps to maintain the biodiversity and stability of the environment

# THE FOLLOWING MAIN PURPOSES WERE STATED

- To shape the spatial structure of natural areas in the most reasonable way considering the ecological, environmental protection, economic and social aspects
- To complete functionally the network of protected areas, connecting them into a complete system with natural areas;
- To protect valuable natural habitats and preserve the migration routes of wild animals, and valuable landscapes
- To soften, compensate, and forestall the anthropogenic impact on nature, to contribute to sustainable development strategy;
- To offer the possibility of nature-friendly management, living styles and recreation by ensuring spatial accessibility to natural areas

# THE FOLLOWING MAIN PURPOSES WERE STATED

- To promote nature conservation outside protected areas;
- To minimise future conflicts of interest incorporating different sectors (forestry, agriculture, transport, recreation) through spatial planning
- To guide settlement and land use
- To preserve the natural self-regulation ability of the environment
- To support international and transboundary co-operation

# METHODOLOGY

## Criteria for designation structural elements

- Nature conservation and environmental protection **values** and threats
- **Morphometrical parameters** of the elements
  - core areas – territorial extent
  - corridors – wideness
- Ecological, environmental, socio-economic **landscape peculiarities**
- **Species** and their **habitats**

# TECHNICAL ISSUES AND OUTCOMES

Based on GIS and existing digital databases

- CORINE Land-Cover map, Basic Map
- Digital data bases (ca 200 layers)
- Landscape maps

## Outputs

- National Ecological Network (1:200 000)
- County Ecological Networks (1:50 000)

# TECHNICAL ISSUES AND OUTCOMES

- Green and Grey Infrastructure were planned together – with equal priority
- Grey Infrastructure

New dump sites, buffer 50m 	New dump sites, buffer 300m 
Corine dump sites, buffer 50m 	Corine dump sites, buffer 300m 
Corine aerodrome, buffer 50m 	Corine aerodrome, buffer 300m 
Corine opencast pit, buffer 50m 	Corine opencast pit, buffer 300m 

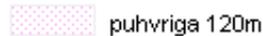
plant species

- Supporting objects

Areas of virgin nature



Objects of virgin nature, buffer zone 120m



puhvriga 120m

Objects of virgin nature, buffer zone 60m



Strictly protected areas



Limited management zone



Special management zone



Corine broadleaved forests



Protected trees



Protected parks



RAMSAR sites



Important Bird Area (IBA)



Protected areas



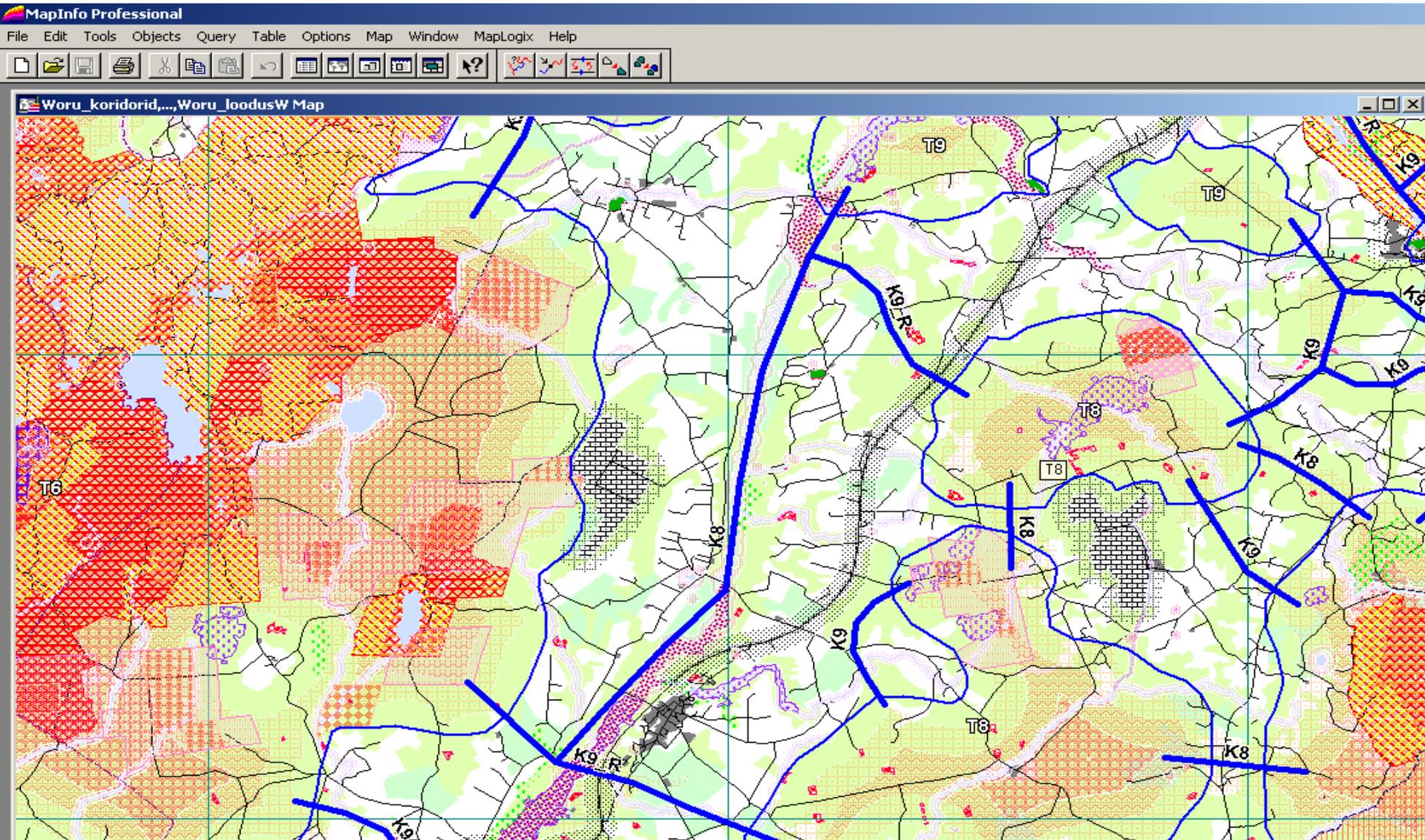
Corine Biotopes



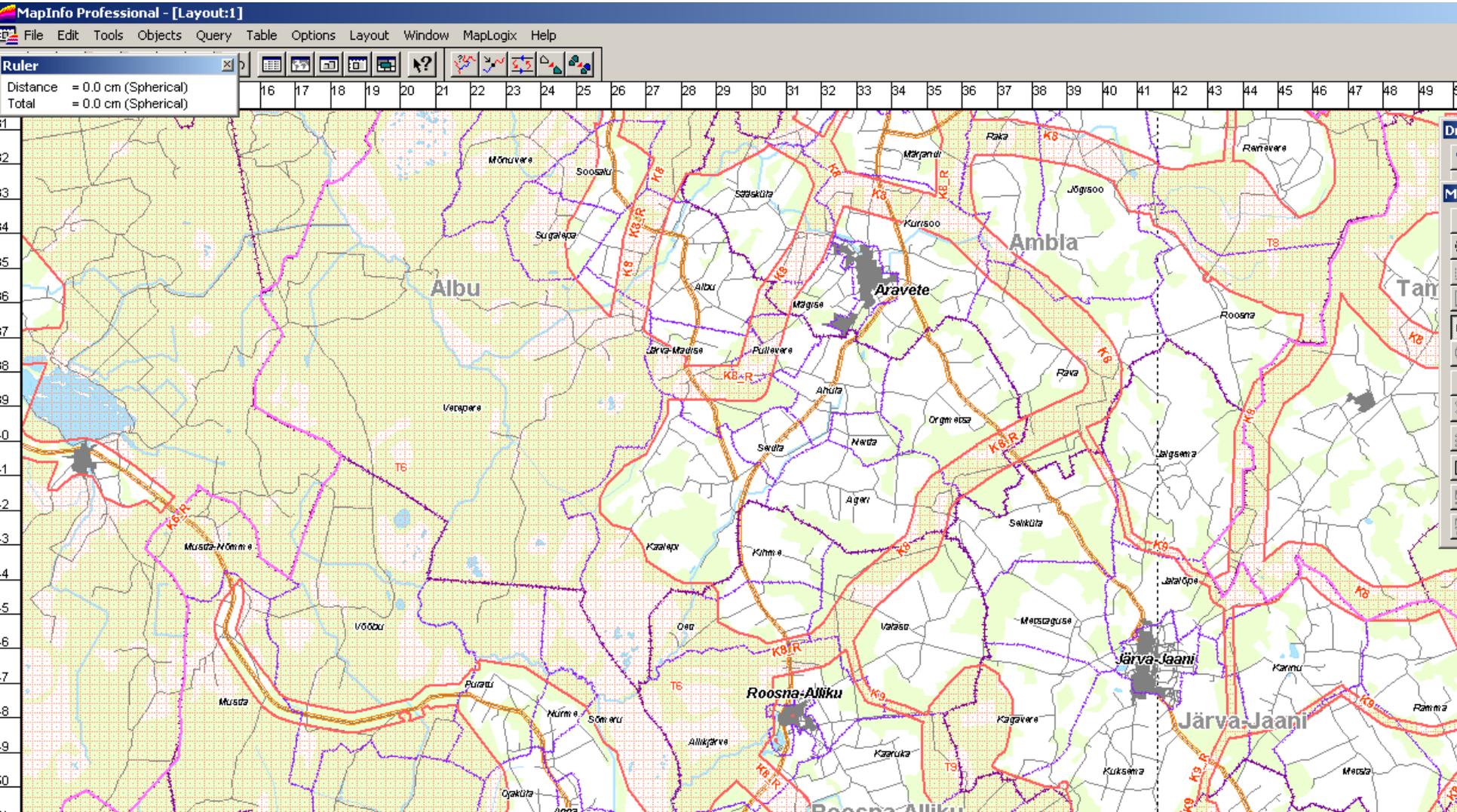
Key biotope



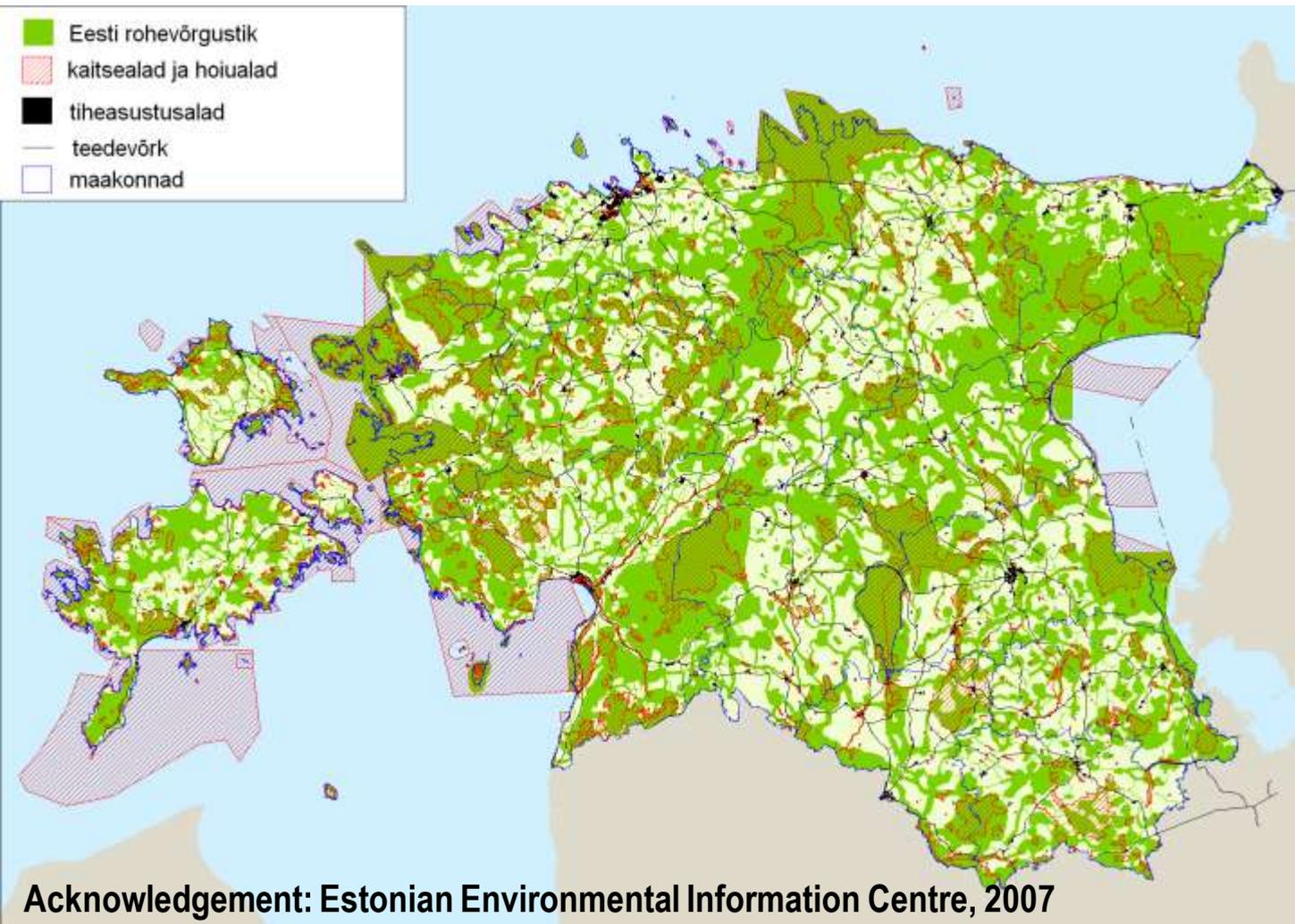
# TECHNICAL ISSUES AND OUTCOMES - WORKSPACE



# DEFINING AND RANKING CORE AREAS AND CORRIDORS



# ESTONIAN ECOLOGICAL NETWORK



The “legal network”: ecological network compiled from ‘15 Green Network plans prepared at county level (2001-2007)

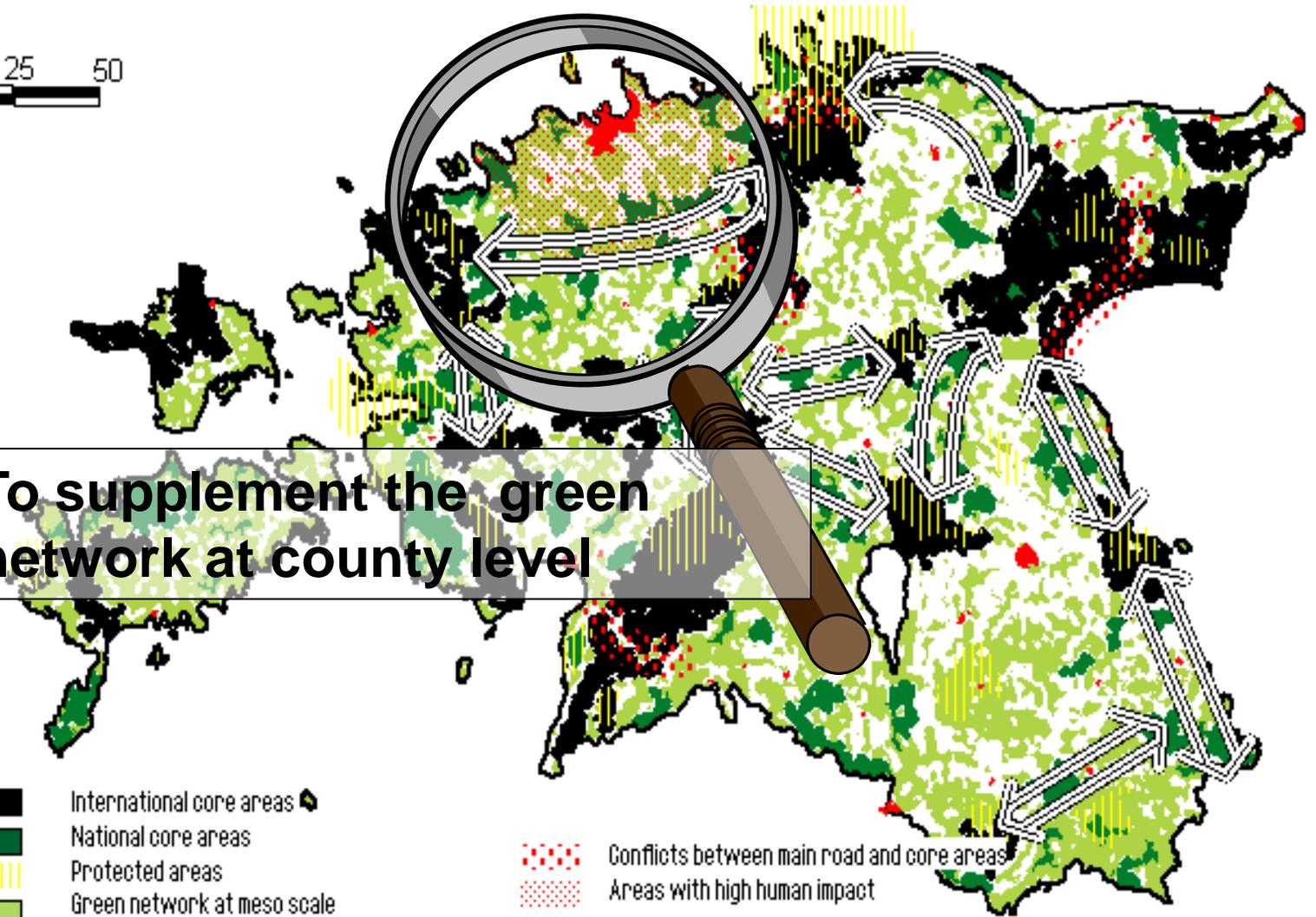
# ESTONIA 2010 GREEN NETWORK



To supplement the green network at county level

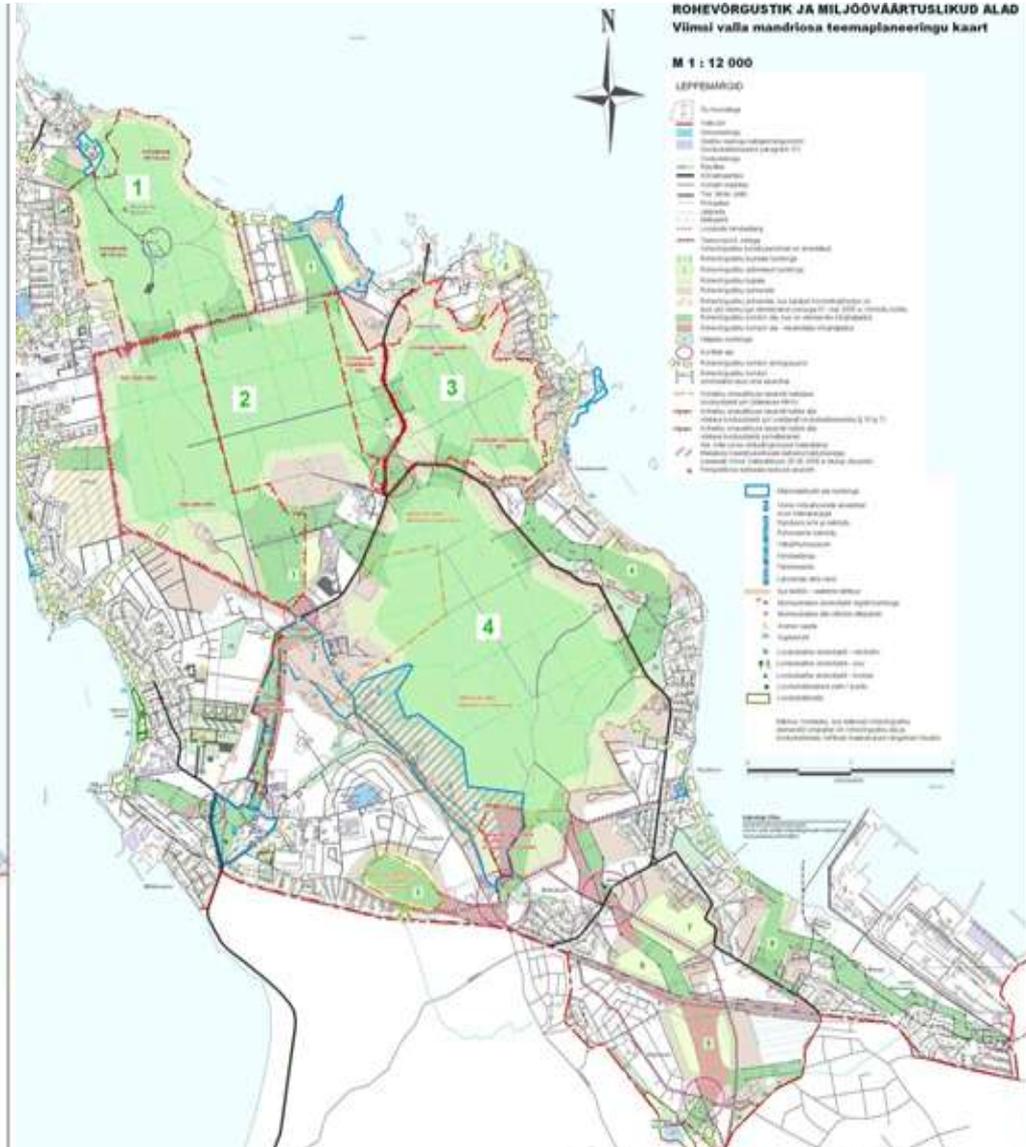
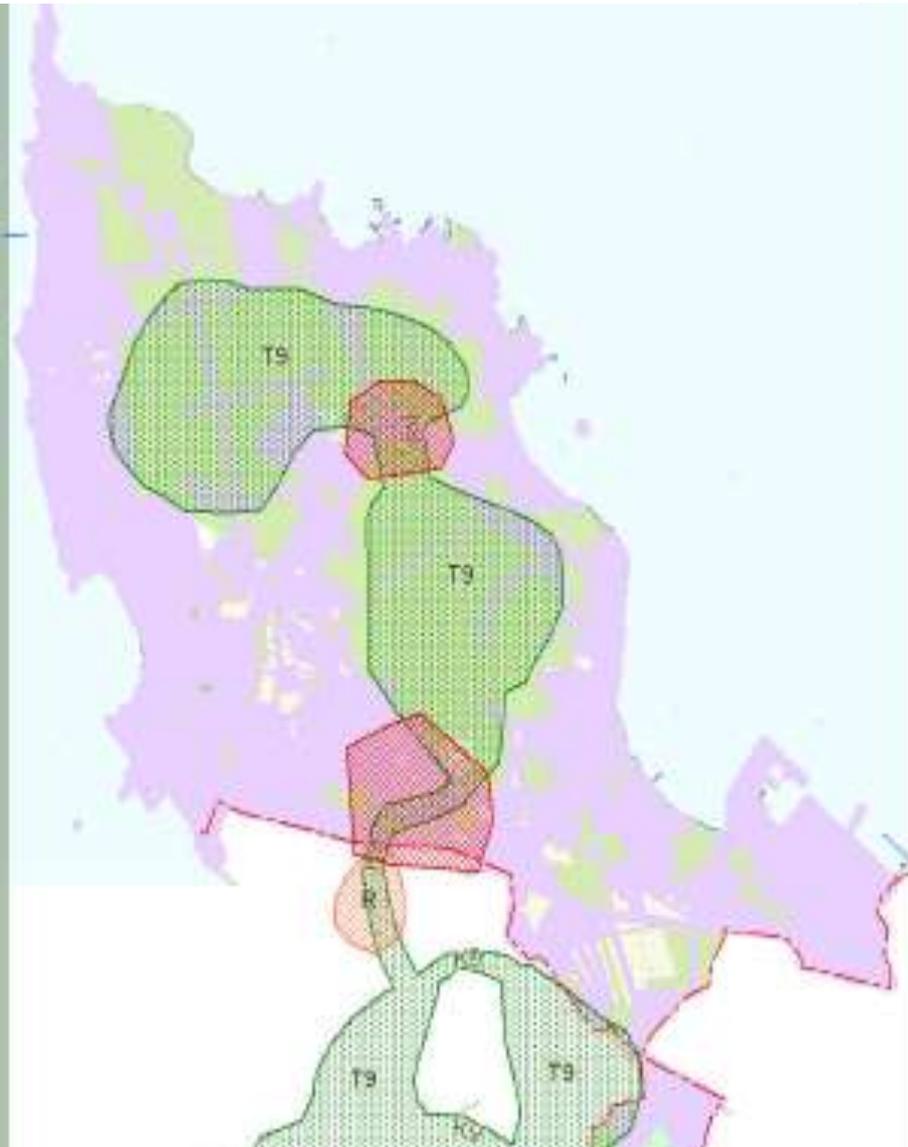
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-  Main green corridors

-  Conflicts between main road and core areas
-  Areas with high human impact





# GREEN NETWORK OF “COUNTY LEVEL” SEEN FROM “MUNICIPALITY LEVEL”



# SPATIAL PLANNING AT NATIONAL AND COUNTY LEVEL

- Necessary land use conditions and limitations were set on core areas and corridors (restrictions, codes of practice, environmental measures, regimes etc.)
- It is important to determine and reach agreement on the list of land use conditions which apply

# RESULTS

- All 15 counties in Estonia have defined and approved green networks at **county level**
- Local authorities have started to define and several (ca 80) have approved the green network at **commune level** (including towns Tallinn, Tartu, Pärnu – thematic planning)

# EVALUATION OF THE ACTION

- Local decision makers often look at designating of the green network as a new source of additional restrictions
- There is a need for practical advice on implementation and for involving stakeholders, supported by direct, open and flexible communication

## FOLLOW UP IN ESTONIA

- Green networks what were designated at the County level should be implemented at the municipal level and sectoral policies
- By 2010, the Green Network had been addressed in 87 comprehensive plans; ca 40% of municipalities

# LESSONS LEARNT

- A **wide interpretation** of the concept of Ecological Networks has advantages:
  - to guarantee the naturally and environmentally grounded space structure, which should guarantee sustainable development in the whole country (Ecosystem services, maintaining ecological functions at the landscape scale)
- **Different sectors/stakeholders** (forestry, agriculture, transport, recreation) and interest groups, including local inhabitants are involved through spatial planning
- **Implementation mechanisms** are developed and defined in the frame of the spatial planning
- **Green** and **Grey Infrastructure** need to be planned together – with equal priority

# LESSONS LEARNT

- The practice shows that the actual implementation of the requirements has been very different among the cases. Many implemented measures are weak
- We should enhance existing methodologies in defining green (ecological) networks
- There is a need for practical advice on implementation and for involving stakeholders, supported by direct, open and flexible communication