



Territorial Trends of the  
Management of the  
Natural Heritage

ESPON 1.3.2.

Second Interim Report

August 2003



## **Territorial trends of the Management of the Natural Heritage**

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Utrecht

**EuroNet EEIG** in co-operation with  
**European Centre for Nature Conservation (ECNC)**

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- EuroNet – Royal Haskoning (leadpartner)
- European Centre for Nature Conservation (ECNC)
- EuroNet – Enviplan
- EuroNet – Land Use Consultants
- EuroNet – Territoires, Sites & Cités

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## Recommendations

Elaboration of ESPON priority 1.3.2 up to now, developed views on the related problems that are translated into recommendations for further policy making. These recommendations are provisional because not all activities envisaged in this project, nor all analyses have been carried out yet.

1. Elaboration and enhanced implementation of Natura 2000 is strongly recommended. This action is expected to be supportive for meeting the ESDP goals of balanced, polycentric and sustainable spatial development. Also the network of natural areas as Natura 2000 aims, as may be expected to add to the attractiveness of regions for starting new activities.
2. Special attention should be given to the Europe large zone located near the former Iron Curtain. Here potentialities are still existing that should be considered as occasional opportunities for development of nature as well as other spatial developments.
3. Stronger integration of Natura 2000 especially with water related policies like the Water Framework Directive addressing not only water quality but also quantity is strongly recommended.
4. The preparation of regional spatial development visions should be stimulated. Such visions that may be elaborated into plans according to the national planning systems, should integrate all aspects relevant to rural development like economic diversification, agriculture, nature and culture.
5. A regional typology should include on all scale levels the social/economic aspects and natural/cultural heritage aspects of a specific region. These aspects must all be considered when applying such a typology for examining the eligibility for funding.
6. The importance of relatively small scale actions to defend the natural heritage against fragmentation by agriculture, urbanisation and infrastructure must not be underestimated. Especially in areas with high development pressure, the remnants of the natural heritage must be considered as extremely important for their effects on the perception of nature, health and spatial quality.

## 1. Introduction

This second interim report on ESPON 1.3.2 Territorial Trends of the Management of the Natural Heritage presents the findings of the second stage of work of the TPG. In the ESPON 2006 Programme, natural heritage has been called an essential part of the environmental assets of each country. "The value of (bio)diversity has been largely recognised by ES policies. Such a heritage must certainly be preserved from hazards, but also creatively managed to reach a condition of sustainable development, for example by the recognition and valorisation of natural networks and individual natural assets in integrated development strategies. New developments must be found to assure synergy and co-existence of men activities and action affecting natural heritage."

Besides, in order to develop more evidence based policies, a monitoring system is required based on clear indicators and data.

On top of that, preparations of the Commissions third Cohesion Report starts in September 2003, the date on which also reports on the ESPON projects should be submitted. Since the commission newly considers territorial cohesion to be one of the three fields in which cohesion should be achieved, ESPON studies gained relevance for policy preparation. This resulted in dominating attention to provide the authors of the Third Cohesion Report with recommendations for implementation. This influenced the activities of the TPG on ESPON 1.3.2 considerably as well as it's Second Interim Report.

This resulted in a Second Interim Report which main structure reflects the focus on recommendations for the implementation: the first chapters up to Chapter 7, describe physical developments related to the natural heritage, which understanding will be refined by the actions described in chapter 6. The second part of the report focuses on the implementation of the policy objective to enhance the territorial cohesion in the natural heritage, concluding in some recommended aspects of a regional typology.

The enhancement of the understanding of the long-term processes in the actual state of the Natural Heritage was also important in the relation to the First Interim Report. The First Interim report tried to identify indicators for monitoring the territorial trends of the natural heritage by analysing the questions that are included in the title of the project and the descriptions of ESPON priority 1.3.2. The First Interim Report resulted in a list of 13 key questions, sub-questions, related data sources and indicators to be further analysed. During analysing these questions the need for guidance, leading to some more focus of the work was felt heavily. The understanding of the century-long processes was helpful to be more selective in the list of 13 questions to be analysed. The list of questions remaining for further analysis, with the related indicators and data are included in annexe 2: Indicators.

The second part of the Second Interim Report (Chapters 8 to 11) considers aspects of the implementation of a more coherent network as promoted by Natura 2000. In order to enhance the natural heritage, the area under protection should increase and individual natural areas should be less isolated from each other. This requires actions on the ground leading to the selection of sites to be protected or even acquired. Therefore the rural areas of Europe should be considered for potential natural sites. The developments in those rural areas, where agriculture, recreation, nature area

main land uses, are highly relevant for the possibilities to enhance the natural heritage. These rural aspects are described in chapter 8 where especially the importance of agricultural developments for potential stronger natural networks is emphasised. In chapter 10 a description of Europe's physical structure is given in order to provide a framework in which actions towards a Europe wide ecological network should fit.

This structure, based on the hydrological system may not be interrupted, on the contrary it should be enforced by actions following from Natura 2000.

The Second Interim Report concludes in two chapters of which chapter eleven focuses on the recommended regional typology in which the combination of socio/economic and natural/cultural characteristics aims at sustainable development. **Chapter 12** recommends integrated development, strategies, integrating natural (and cultural) aspects with regional economic development, agricultural and water management policies.



**PART I: Physical developments related to the natural heritage**

## 2. Spatial development

Increases in population, increases in the use of space per family as well as increases in the use of space per individual, especially in areas with high prosperity, all lead to ongoing growth of residential areas.

Together with space needed for economic activities, services, infrastructure and tourism and recreational facilities this results in continuous urbanisation and a decrease in natural heritage. Next to urbanisation, the land needed for agricultural production also increased with population growth. The area cultivated for agricultural production became the main land use of Europe. Especially where more effective production required modifications of the natural hydrological system, the nature values came under serious threat.

Many current and past human activities also have polluting effects on the environment. These activities affect ecological quality of natural areas, resulting in a loss of species and a decrease in biodiversity.

Continuous incremental reduction of the natural heritage and ecological quality has resulted in an awareness of its value and the importance of careful management of the natural heritage. This is clearly reflected in the European Spatial Development Perspective which extensively noticed nature as being under threat.

### 2.1. Incremental process

During the prehistoric periods when Europe was sparsely populated by nomadic people. Areas of nature conservation value, which could be termed 'wilderness', were ubiquitous. Specific habitats were related to specific geomorphologic conditions like gradients and waterlines.

As populations grew, settlements developed in areas with opportunities for agriculture and fishing. As specialisation of skills occurred, market towns grew up, which capitalised on locations with optimal accessibility; crossings of trade roads, bridging rivers, and harbours. Towns also developed at places of political and military strategic importance. Agricultural production was not focussed anymore on feeding the local population, it became subject to trading thus stimulating further cultivation of wilderness.

Roads connecting settlements were essential for settlements developing into cities. In areas that were not easily accessed, for instance in mountains or in marshlands, less development pressure occurred and nature was less affected. In the 19<sup>th</sup> century, when the railway system developed, routes were decided on the basis of the cities to be connected and the local technical limitations. Rail connections were also more likely in easily accessible areas than in mountains and marshlands.

The development of the railway system and, after the Second World War, the system of motorways, encouraged settlement and urbanisation at points with improved

accessibility. In some areas long distance connections necessitated connections across peripheral regions. As a result natural areas were crossed by new infrastructure at the same time giving access to areas that previously were isolated. That again stimulated further urbanisation.

Development of towns and cities and infrastructure resulted in continuous fragmentation and a decrease in natural areas.

The increase in land used for the extension of agricultural land gradually consumed wilderness, thus decreasing the natural areas. However, some types of agricultural land use, especially traditional farming, may contain natural values.

The continual erosion of natural areas by agriculture and urbanisation and other related processes, continuously led to the fragmentation of natural areas. It could be said that the actual natural heritage consists of those areas that are left untouched by the age-long process of urbanisation, infrastructure development and agricultural cultivations.

Map 2.1 Percentage built-up area for NUTS3 regions

Map 2.2 Population density for NUTS3 regions

Map 2.3 Population growth for NUTS3 regions (1995-2000)

Map 2.1 provides an overview of the state of the built-up area in Europe in .... Data are only available of this year.

Map 2.2 shows the population density in Europe for NUTS3 level in ..., while map 2.3 shows the degree of population growth from 1995-2000.

Map 2.4 provides an overview of space occupied by agriculture.

It may be concluded that during the many centuries of Europe's spatial development the trend has been for a continuous decrease in the area of natural heritage. In times of high prosperity and strong population growth this process has been strongest. Since the start of the industrial revolution the process of spatial development has been extremely strong, in terms of land take for towns, industries, mining, intensive agriculture, tourism and infrastructure. Development has also put increasing pressure on natural resources through pollution.

## 2.2. Counter force

In all stages of this general spatial development a gradual replacement of nature by other land uses can be noticed, showing the fact that those functions are generally stronger forces than the natural land uses. The counter force to keep specific green areas is stronger where areas contain highly appreciated qualities. Those qualities may be a high degree of biodiversity, extremely rare species or simply the fact that the area provides a scarce piece of open space in a developed area. Such a relatively scarce piece of open space at the same time provides the environment with an extra quality. Its attractiveness to reside or to work in the proximity of such an open space translates in more valuable quality of place. The latter factor is well illustrated in London, where common land was retained as parks in an area subject to strong development pressures.

It is arguable that the more a population feels connected to an area of natural heritage, the greater the counter force against urbanisation will be. Areas of natural heritage are increasingly being more valued as people recognise the health benefits associated with open spaces, and also the value to developments, for example as reflected in higher house prices.

### 2.3. Nature under threat

In the ESDP<sup>1</sup> attention is given to the loss of biological diversity and natural heritage and to increasing pressure on landscapes. Threats have been formulated as follows:

(310)<sup>2</sup> The diversity as well as the preservation of the natural and cultural heritage in the EU is threatened. The increasing threat to this heritage appears to be negating the progress which has been achieved in recent years in the fields of nature conservation and protection of historical monuments. It is important to realise that the wide diversity of Europe's natural and cultural heritage presents both risks and opportunities. The main types of endangered area, such as coastal areas, mountain ranges, mud-flats, reservoirs, woodlands and cultural landscapes, are at great risk throughout the whole of Europe.

(311)<sup>3</sup> Coasts with their great diversity of sensitive biotopes are of major importance for human living space, for tourism and transport, for industry and energy production and for agriculture and fishing. They are generally threatened by urban construction, mass tourism, the excessive use of fertilisers and pollution. Mountains provide habitats for wild animals and plants and are the source of fresh spring water. They are not only important natural areas, but frequently also significant economic and living areas. Mountain areas in the EU are in many cases threatened by growing mass tourism, dams and new transport routes and by overgrazing, erosion and non-cultivation.

Mudflats, rivers and lakes have vital ecological functions and are unique repositories for archaeological finds. The number, size and territorial integrity of mudflats is being severely reduced through drainage, cultivation, sinking of the ground water level, reduced water flow and new transit routes. Rivers are being straightened, their flood patterns are being restricted and dams are being built. Woods and forests, as the "green lungs" of Europe, contribute to the conservation of water and land resources and generally to the beauty of the landscape. They are also an important habitat for flora and fauna and provide recreation areas for people. The main hazards for the woodlands are air pollution, insect and fungus infestation and forest fires. It should not be forgotten that almost all areas which are regarded as endangered are areas with cities, residential locations and infrastructure, in which people live and work.

(312)<sup>4</sup> (...) The diversity of soil types and their natural functions are, however, greatly threatened by human activity in many areas.

<sup>1</sup> ESDP, European Spatial Development Perspective. Agreed at the Informal council of Ministers responsible for Spatial Planning in Potsdam, May 1999, Published by the European Commission, Luxembourg, 1999) ISBN 92-828-7658-6

<sup>2</sup> paragraph number ESDP (Luxembourg, 1999), page 72

<sup>3</sup> paragraph number ESDP (Luxembourg, 1999), page 72

<sup>4</sup> paragraph number ESDP (Luxembourg, 1999), page 72

(313)<sup>5</sup> Moreover, climate is a part of the environment, of the natural resources, suffering more than ever from the negative impacts of human activities. Increases of gas responsible for the greenhouse effect, caused by humans, modify temperature and the distribution of rainfall. This leads to shifts of arable areas, endangers flora growth and increases both periodicity and intensity of bad weather.

(323)<sup>6</sup> The threat to cultural landscapes in the EU is closely related to the rationalisation and intensification of agricultural production and the objective of agricultural “extensification” in some areas. In other parts of the EU, marginalisation tendencies are evident. In addition, the expansion of cities and isolated settlements, consisting primarily of second homes, threaten cultural landscapes.

#### 2.4. Fragmentation

As the ESDP extensively recognises it is not only the decrease of natural area that causes major threats to the natural heritage. An important threat consists of fragmentation of the natural areas. Especially the effects of the building of infrastructure to increase accessibility of regions resulted in fragmented remnants.

Map 2.5 Distribution of semi-natural land cover types  
Map 2.6 Percentage of natural area for NUTS3 regions

Map 2.5 gives an overview of natural areas and forests, the Corine landcover classes with special reference on natural areas and forest. The fragmentation can clearly be observed. Map 2.6 further underpins this argument by showing the percentage cover of natural area and forest for each NUTS3 region. These maps all demonstrate the overall impression of fragmented natural areas.

Fragmentation of the natural heritage is the result of the ongoing incremental process, which has left Europe with a natural heritage consisting of many small disconnected islands surrounded by other land use types. In recent decades a range of initiatives to protect the natural heritage, at the national and European level, have been implemented. Those policies are discussed in chapter 3. For monitoring, measuring substantial results of interventions to counteract the process will require long periods. The process of fragmentation needs careful monitoring. The European Environmental Agency (EEA) defined a fragmentation index that can be used for a sound monitoring system. Therefore indicators must be identified that allow for analysis on basis of sound data. A first suggestion for a fragmentation index is included in appendix ... The index will be elaborated during the next phase of the project.

#### 2.5. The process in DPSIR - terms

<sup>5</sup> paragraph number ESDP (Luxembourg, 1999), page 72

<sup>6</sup> paragraph number ESDP (Luxembourg, 1999), page 74-75

The above described process can be depicted in terms of causal relations. Therefore the DPSIR methodology as promoted by the European Environmental Agency is useful. It distinguishes the sequence of forces and consequences as follows:

- D = Driving force
- P = Pressure
- S = State
- I = Impact
- R = Policy response.

To these forces different indicators can be attributed in order to measure its magnitude.

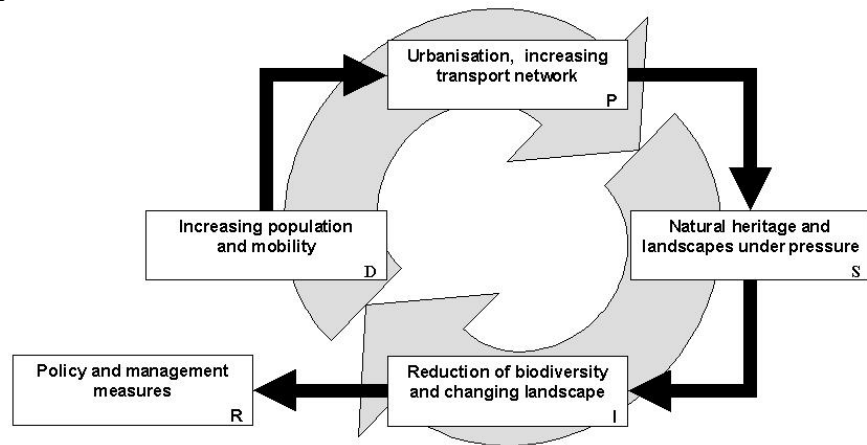


Figure 2.1 The process in DPSIR-terms

The illustration shows the following causal relation:	
Driving forces	<i>geo physical processes:</i> - climate changes <i>socio economic development:</i> - increase of population - gentrification - increase of mobility of persons and goods
Pressures	<i>geo physical pressures:</i> - river floodings - desertification <i>socio economic pressures:</i> - urbanisation - increase of infrastructure
States	<i>natural heritage:</i> - biodiversity - landscape

Impacts	<i>reduction of natural areas:</i> - decrease of biodiversity - landscape change
Policy response	<i>sustainable development:</i> - conservation of biodiversity

### 3. Policy responses

In general the conservation of nature and biodiversity is regarded as very important for man. Nevertheless, when it comes to concrete policy decisions, the interests of natural heritage often appear to be less important than the shorter-term economic or social interests of the society. To secure conservation goals, biodiversity concerns need to be better incorporated into other policy areas. This issue remains a major obstacle but is now receiving increasing attention in policy development.

#### 3.1. Justification of protection

While pursuing the ambition to protect nature, one of the key questions to answer concerns the justification for protection. Different motives connected to the function of nature can be used to justify the protection. Examples of these motives are:

- Economics and production  
Nature protection is necessary, as it performs a range of functions, including food-production, building material, a source of employment and also it acts as a sink for pollution, for example absorbing carbon dioxide and other pollutants caused by human activities.
- Natural functioning  
Nature is important for regulating and stabilising processes due natural phenomenon and human activities. Examples include the regulating function of oceans on climate, forest on soils and the purifying qualities of soils on acid rain.
- Perception  
This aspect includes the appreciation of nature as source of beauty, space, inspiration and art.
- Recreation and tourism  
Nature has an important function in terms of leisure and welfare.
- Science  
Nature is an important source of scientific information, for example biological, archaeological, and geological. This motive also includes the so-called signal or monitoring function. The presence or absence of certain species can indicate signs of a changing environment.
- Ethics or intrinsic value of nature  
Nature also has a value which is not directly related to the welfare or well being of people. Man has a moral obligation to secure and protect nature.
- Politics  
Protection of nature could enhance the feeling and solidarity of a community.

Whether lack of, or irresponsible protection of nature will in the short term have a negative impact on the well being of mankind is disputable. However, in the long-term shortages of for example raw materials and food might occur. With the ongoing large-scale deforestation effects on climate and erosion will be significant but difficult to predict. Global warming, temperatures rising, unpredictable rainfall and consequent floodings may be future reality. As such processes are often irreversible, nature protection is vital for a sustainable development and for the conservation of the world's natural and cultural resources.



### 3.2. Protection in historic context

Conservation takes into account the sustainable use of the natural resources in an area to be conserved. Protection refers to the intentional action to maintain the existing condition of the natural heritage, and of actual biodiversity specifically. The principle of 'protection' can be extended to the notion of biodiversity 'enhancement'.

Although the first international conference on bird protection was held in Paris as long ago as 1891, the European inter-governmental approach towards nature conservation is relatively young – about 35 years. The awakening of nature conservation in continental Europe began with the establishment of the first national parks in Sweden in 1909 and Switzerland in 1914. The first nature reserve in the UK (Wicken Fen) was established in 1899 (Marren, 1994).

Historically, nature conservation policy has focused on the conservation of species and/or habitat types, which can be described as a sectoral approach. The European Diploma, an 'award scheme' introduced by the Council of Europe in 1965 and their later concept on the 'European Network of Biogenetic Reserves' (1976) were meant to stimulate governments and NGO's to start thinking about the European dimension of nature.

Further, the first European Conservation Year (1970) as implemented by the Council of Europe and the Bern convention on the Conservation of European Wildlife and Natural Habitats were very important steps in this sectoral phase of the European process.

Public interest became more significant in this period, leading to powerful NGO's, among others, the IUCN (International Union for Conservation of Nature and Natural Resources) and the World Conservation Union. From then on a number of major conventions were drawn up, as described further on in this chapter.

Since 1979, the year in which both the Bern Convention and the Bonn Convention took place and the Birds Directive was adopted, the EU has played an increasingly active role in developing Europe's nature conservation policy. Although the conservation of species and habitat sites was still very much at the heart of nature conservation policy in the early 1990's, it was recognised that to truly conserve Europe's natural heritage a set of protected areas was not enough. Gradually, the concept of establishing ecological networks, in which the protected areas would be connected and buffered, took shape and was introduced by the Habitats Directive.

Natura 2000, which will be described later on in this chapter, incorporates the Special Areas designated by the Habitat Directive as well as those designated by the Birds Directive to develop a more extensive framework for the development of a coherent European ecological network.

The development of policies on natural heritage shows a clear progress in the concern about conservation of natural heritage – from strict protection as a defence against the extinction of species and habitats (reactive) to action involving local actors and finally to the will of creating natural networks (with Natura 2000) and also from

protection of given species such as birds, enlarged to landscapes and peoples living environment.

### 3.3. Key policies

Influence of Policy on Natural Heritage	Protection of Fauna	Protection of Flora	Protection of Sites	Protection of Habitats	Policy Orientation	Implementation of EU Policy
Natural Heritage Policy						
Ramsar Convention	Global (migratory bird species, especially waterfowl)			Wetlands associated with species		Ramsar sites are directly incorporated into the Birds Directive as category 'c' of Special Conservation Areas
World Heritage Convention			Global	Global		
Bern Convention	European	European		European		
Bonn Convention	Migratory species			Associated with species		
Birds Directive	EU (Birds)			Associated with species		Nature conservation
Convention of Biological Diversity					Global	
Common Agricultural Policy						Agri-Environment
Habitats Directive	EU (other than Birds)	EU		Associated with species	Natura 2000	Nature Conservation
Pan-European Biological and Landscape Diversity Strategy					European	
European Community Biodiversity Strategy					EU	Agriculture, Fisheries, Natural Resources and Transportation, as related to BioDiversity
EU Structural and Cohesion Funds						Can apply to projects in EU with a nature conservation and sustainable rural
PHARE and TACIS						Can apply to projects in CEE and NIS countries with a nature conservation and sustainable rural development component
Agenda 2000					Promotes agri-environment and sustainable rural development	General
Environmentally Sensitive Areas					Special agri-environment funding for specific rural areas	Agriculture
European Landscapes Convention					European	

**Table 3.1 Overview of key policies on European level**

Natura 2000 is the principal EU policy instrument for the protection of flora and fauna and habitats, however it does not assimilate all the policies described above into one spatial strategy. This is because policy, including the agri-environmental measures, is not unified at present. A number of DG's of the European Commission have a remit to some degree to address nature conservation, including Environment, Region and Agriculture, and Transport. Whilst these departments do discuss the issue, there is no clear centre of responsibility setting overall policy principles.

Natura 2000 gives an administrative status to both protected and non-protected areas (nature reserves and farm land, for example). It seeks to ensure Member States accept their responsibility to implement measures to ensure the safeguarding of European fauna and flora in the context of the EU territory. Natura 2000 lists 'priority' species and habitats, which are prioritised for EU financial support.

In terms of spatial influence, at the present time the Regional Structural Funds and Cohesion Funds have a far greater impact on land use than Natura 2000, as these funds determine the extent of infrastructure and entrepreneurial investments receiving financial support from the EU. The scale of spending is incommensurate with what is / will be available through Natura 2000. With regard to the level of spending for agri-environment and rural development support through CAP, it has been suggested that funds from CAP be used to implement Natura 2000. This proposal however, has not been decided on.

The Ramsar Convention has had an enormous impact on the designation and protection of many wetlands in Europe, often large in size because of the requirement to serve the needs (migration, breeding, wintering) of at least 10,000 birds of a designated species. To compare, the size of a habitat needed to ensure the safeguarding of a plant or small fauna species under Natura 2000 could be in terms of tens of square meters or hectares. To protect an Environmentally Sensitive Area, as a further contrast, an area would be needed of several, or tens of, square kilometres.

The conventions regarding natural heritage have an influence over European and national policy orientation (World Heritage, Bern, Bonn, European Landscapes); and the Pan-European Biological and Landscapes Diversity Strategy guides the setting of objectives for natural heritage, without having the status of a legal instrument.

The European Birds and Habitats Directives are implemented through national legislation, whereas the terms of the Regulations that structure Environmentally Sensitive Areas have been implemented directly as national statutes.

The EU Structural and Cohesion Funds – as well as PHARE and TACIS in the relevant non-EU countries – refer to financial funds that are associated with investment programmes that have as their principal motivation to improve infrastructure and entrepreneurial activity, so as to lessen the disparities of competitive advantage within the Common Market. Some of this structural funding is also associated with governance issues, including the improvement of institutional capacity for the conservation of the natural heritage. This concerns mainly 'in situ' conservation by means of the establishment of protected areas.

The Common Agricultural Policy also provides structural funding, principally for the improvement of agricultural efficiency and the encouragement of entrepreneurial activity to transform agricultural produce as well as for the market penetration of

goods coming from the agricultural sector. This policy has been reformed, serving to provide farmers with opportunities/incentives to undertake more environmentally sustainable agricultural practices, for example through participating in agri-environment schemes. Agenda 2000 is a very broad policy instrument seeking to define policy principles for all EU programmes to be applied in the period 2000-2006, also making clear that the reinforcement of the agri-environmental policy, combined with a rural development programme, is the main strategy for integrating the environment into the CAP.

The Integrated Coastal Zone Management (ICZM) identifies and promotes measures to remedy the generally encountered problems in coastal zones of deterioration of the environmental, socio-economic and cultural resources in an integrated approach.

The instruments to preserve and enhance the natural heritage in Europe are varied in their operational mode. Their overall influence on the spatial organisation of the natural heritage could gain immensely from a concerted policy for definition of objectives and their implementation.

#### 3.4. Implementation of policies on local level

Policies on European and national level provide the framework within which decisions on local level will take place. However, at the local or regional level decision making takes place by local governments, working in the local context. It leaves no question that this leads to different strategies and policies. Decision makers have to deal with local developments, threats, opportunities and also local sentiments, action groups, etc. When deciding which natural heritage areas to protect, many local considerations and factors play a role, such as other interests in the area, the importance attributed to natural heritage by the local policy makers, the importance attributed to an area by the local population and the availability of financial means for delivering management and protection.

#### 3.5. Protection

From this chapter it can be concluded that policies on natural heritage have mainly been focused on the conservation of specific species, gradually enlarging the scope towards conservation of habitats. The policies addressing specific species are in fact fighting symptoms, instead of fighting the source of the problem. Fighting the source of the problem means creating or preserving the space needed for habitats, which Natura 2000 in fact aims for by creating a network of natural areas.

As discussed, many different systems of protection exist, depending on priorities. Legislative and institutional systems are diverse and also the local management objectives of the areas differ. Caused by these differences, it is difficult to compare or categorise the designated areas.

To overcome these differences and to create a common platform for protection, the UN came up with a single definitive list of protected areas classified by management categories, defined by the IUCN World Commission on Protected Areas (WCPA). Currently the list is maintained jointly by the IUCN-WCPA and the World Conservation

Monitoring Centre (WCMC); the latest list was published in 1997 (see map 4.2 in chapter 4).

#### **4. Territorial effects of the policies on natural heritage**

From the previous described policies it appears that policy is in general focused on the quality of natural heritage. The aims are to obtain or maintain a high level of biodiversity, to conserve unique species or unique landscapes.

Different species need different types of biotopes. The biotope is the area, providing the specific circumstances needed for the species to survive. Biotopes of different species may or may not overlap. Also, one species may need far larger biotopes than other species.

If a certain unique species is to be protected, this means that its biotope has to be protected. Protecting a biotope means occupying space. Thus, although the policy objectives aim at quality, they have a clear territorial component in the form of needed space.

##### **4.1. Territorial effects on different scales**

Territorial effects, caused by policy, are the effects this policy has on the patterns of land use. Examples of patterns are fragmentation and concentration of land uses.

The territorial effects are very different when regarded at different scales. Where at the macro scale there may be a concentrated pattern, on the micro scale fragmentation may be noticed.

An example is the Ruhr area in Germany, which at the macro scale seems to be a very concentrated area of urban use and infrastructure. However, when considering the area at the micro scale, there appear to be large areas of natural heritage or open space. Therefore it is very important to define territorial patterns according to scale.

Regarding the territorial effects of management of natural heritage, one can see at the scale of individual natural areas, that management may affect the zoning within the areas, buffering towards other land uses, different activities within the protected area and different measures for protection of the natural heritage.

At the larger scale (European, national) the spatial distribution of the natural heritage can be considered.

##### **4.2. Overview of designated natural areas**

To provide an overview of the effectiveness of all different policies on natural heritage, it would be ideal to have data on all different designated areas and the kind of protection exerted on the areas. However, such data do not exist.

There exist data on the spread of designated Ramsar sites (map 4.1), providing data on the location of the Ramsar sites, the year of designation and the size. Of other types of designated areas, no specific data are available.

IUCN provides an overview in a list of different categories of protection, year of designation and the size of the area.

Areas are included in the list, if they meet the following definition:

*An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.*

The categorisation of the areas is based on the type of area and reason for protection. Examples are wilderness area or managed natural resources area. This does not provide the required information about the intensity of the management or the effectiveness. More information on this will be provided by means of the management questionnaire and the case studies and scenarios as discussed in chapter 6.

Further explanation of IUCN categorisation is described in annexe ...

Map 4.1 gives an overview of the designated Ramsar sites.

In general, most protected wetlands are found in the coastal areas. The map shows the highest concentration of protected wetlands in the coastal zones of the North sea and the Irish sea. A lower concentration is located in the mountain ranges of southern Europe.

It should be stressed that the sizes of the Ramsar sites vary greatly.

Map 4.2 gives an overview of the distribution of designated sites according to IUCN throughout Europe.

This map shows that designated areas are widely spread over Europe with striking concentrations in the western half of Germany, Czech Republic and Switzerland. Also in Denmark, Austria and Estonia high concentrations are found.

Relatively low concentrations of protected areas are found in Sardinia, Romania, Bulgaria, Greece and Ireland.

Map 4.3 shows the distribution of designated areas per time period. The maps are not cumulative, which means that each map shows only the areas, that have been designated during that period of time.

The different time periods show that often designation of many areas in a country took place during specific periods of time. In Italy, for example, the greatest part of the areas have been designated in the period 1970-1990. The same counts for Greece and Hungary. In Spain and Ireland most designations have taken place in the period 1980-1990. In the Czech Republic and Germany, designations have continually taken place from 1930 on, and in Denmark even before.

This suggests that designation is not so much dependent on local circumstances or the value of an area, but more on the legislative phase the country is in.

Differences in legislative, institutional and financial support do have an effect on the number and rate of designations in an area. After implementation of legislation on natural heritage protection there is a clear increase in designation. Also in times of economic prosperity more budget will be available for purchases of natural areas and / or implementation of management measures and hence designation.



It can also be concluded that some countries, such as Denmark, Czech Republic and Germany, have a long history of protection of the natural heritage, as sites were designated relatively early compared to some other European countries.

The differences between countries can be explained by differences in priorities and motives. While in Germany cultivated landscape had priority, in France the aesthetic and hunting motives were regarded to be more important. For example the first protected area in France was designated for its natural beauty.

Map 4.4 shows the mean size of the designated areas.

From this map it appears clearly that the mean size of designated areas is the largest in Finland, the Alps, Scotland, Sardinia and Greece. Also large mean sizes are found in Spain, southern France, Corsica, the Carpatians and a bit less in the lower mountain ranges. The mean size is smallest in the flat coastal areas in north western Europe, Ireland, parts of eastern Europe and parts of Italy.

Concluding from the maps, it can be stated that protection has taken place for diverse reasons, such as uniqueness of a habitat/species or due to it being endangered with extinction. On the other hand, designation is largely dependent on the legislative phase of the country, and also on the local circumstances. As the focus is mainly on protection of species, the types of areas (the biotopes) are of very different kind. This means that different measures have been taken on the already dispersed natural values.

## 5. Concentrations of protected areas

In chapters 2 and 4 the actual general dispersal of natural areas as well as protected natural areas has been described. Nevertheless, maps presenting the locations of natural areas and the protected natural areas show some slight patterns of concentrations.

Questions arise about the causes of those concentrations:

- Are concentrations of protected areas always directly related to areas with large natural values?
- Are larger and smaller protected areas equally distributed?
- Is there a relation to spatial development pressure?

Answering those questions may help to understand what factors were really decisive for decisions about the designation to protected areas.

As described before, Europe's large area cultivated by agriculture, its dense population and industrialisation put a lot of strain on the natural heritage. The ways in which local societies react on these strains seems to be different.

### 5.1. Distribution of natural areas

Map 2.5 in chapter 2 presents the spatial distribution of natural areas in Europe based on Corine landcover data. It shows the large-scale pattern of natural areas. Map 2.6 presenting the percentage of natural area cover (including forests) for each NUTS3 region shows a similar pattern. In both maps the large natural areas can clearly be identified in Finland, the Alps, The Cantabrian mountains, the Pyrenees, the Carpathians, Greece and Scotland. The dominance of mountainous regions is obvious. Apparently those areas provide biotopes in the different climate zones that are of high natural values. The relative inaccessibility and the remote locations of these areas has protected these areas from development pressures.

The fragmentation of natural areas is illustrated in the appendix, showing the number of natural area patches and the average size of the patches for each NUTS3 region. Although the sizes of these regions are not similar, the map gives an impression of the degree of fragmentation of the natural heritage. Most extensive fragmentation shows in the coastal zones of France, Ireland, England, Belgium, the Netherlands, Denmark, but also along the rivers Loire, Seine, Po, Elbe and Danube. In those areas there is relatively high development pressure as a result of a combination of intensive agriculture land use in Ireland, England, France, Belgium, Netherlands and Denmark with strong urbanisation in England, Belgium, The Netherlands and along the rivers. The degree of urbanisation and hence fragmentation is also illustrated in map 2.1.

## 5.2. Designation

Map 5.1 shows the average size of designated areas with the percentage built-up area overlaid. It shows that the size of designated areas is smaller in highly urbanised areas. This observation is also strengthened by map 4.4, that shows the mean size of natural areas and map 5.2, which shows the relation between coverage of natural area and extent of designation. Hence in those areas where the fragmentation is limited the designated areas tend to be larger in size.

A correlation between an indicator for development pressure such as population density and average size or patch density of designated areas could be expected. However, statistically this correlation cannot be shown. Assuming that development pressure is an important factor to decide for protection, apparently differences in population density and growth are not sufficient to show a clear correlation.

## 5.3. Potentials

The most obvious conclusion of the foregoing is that a large proportion of Europe's natural heritage is concentrated in the mountainous regions of Europe and that the existing natural values are most fragmented along coasts and rivers and in intensively used agricultural regions like in Ireland and Denmark.

A restricted degree of accessibility of large parts of the mountainous areas results in limited development pressures in the massifs. The area of the former Iron Curtain has been inaccessible for 40 years. This was a no-go zone for 1000 km of length. The consequence of a long absence of development pressure is that in that zone a large concentration of relatively undisturbed areas is located. The maps show here occasionally concentrations of large natural areas. The accession of central European countries will reverse the location conditions of this zone substantially. Instead of being a peripheral inaccessible region, this will become a centrally located region, connecting countries that were previously isolated from each other. The low development pressure in this zone resulted in a 50 year long period of relatively undisturbed natural developments, which now provides a large potential to add to Europe's network of natural heritage. This potential of a pan European size should be fostered. It provides possibilities for enhancing a pan European network, extending Natura 2000 to the east and at the same time it provides possibilities for other spatial developments. Especially non-polluting economic activities that require quiet and healthy environments may find here excellent sites, near new east-west infrastructural connections, provided that those spatial developments are planned in a sustainable and integrated way.

The same may apply for areas near the boundaries of European states that have had a relatively peripheral position for a long time. Also other areas may offer similar potentials which should be identified when elaborating the network.

## 5.4. Conclusions

It is clear that designation and fragmentation are closely related. Whenever valuable natural areas are under high development pressure, which results in threats to their size and biodiversity, the tendency to protect will be stronger. In those regions, designation is a defensive instrument. Although these protected areas are often small in size, the restriction of urbanisation and agriculture have a major impact on local spatial processes. The management of natural heritage can provide an equal counter force to urbanisation, thus guiding urbanisation to areas that support sustainable spatial development.

Based on the presented maps, it can be concluded that natural areas are under huge pressure in large parts of Europe and that fragmentation is a serious problem especially in areas with high development pressure. To conserve natural habitats, fragmentation needs to be addressed.

The creation of a network connecting patches to coherent habitats allowing meta-population survival and maintaining biodiversity as promoted in Natura 2000 (see chapter 7) should be enhanced strongly. The large north-south zone through Europe along the former Iron Curtain offers excellent possibilities for responsible spatial developments. The ecological network can be extended to the east and also attractive locations for new economic activities can be developed. Also other possibilities for developing a Europe wide network should be identified. In chapters 7 and 8 the way to elaborate a network as well as the aspects to be considered are discussed.

## 6. Refining understanding

**Chapter 3** focuses on European policies on natural heritage. These policies are developed at the macro scale, establishing the main means of management. However, to develop a good understanding of the mechanisms of designation we also need to consider 'lower' scales of policy, to find out what mechanisms play a role at the scale at which implementation takes place.

By means of developing case studies and scenarios the understanding gained by the analysis of the management policies on natural heritage can be refined. These studies will provide detailed information about the management, the implementation of management and the territorial local context to explain effectiveness of management of the natural heritage.

### 6.1. Case studies

The case studies will be carried out using a harmonised checklist, designed to fit with different types of management, different territorial contexts and different scales, encompassing the following issues:

- Description of the territorial context
- State of the natural heritage
- Assessment of the spatial interrelations (the local or regional context, the relations to urban areas, infrastructure and to other natural areas)
- Assessment of the effectiveness of the management
- Assessment of the extent to which the case study supports ESDP objectives

In addition to refining our understanding of policy and management of the natural heritage, the case studies will help to meet the following objectives:

- Evaluation of the relevance of the database
- Evaluation of the relevance of the analysis of the interrelations
- Highlight the limits and the level of reliability of the analysis
- Feeding the project with ground-based information
- Provision of matter to develop long term evolution scenarios.

It was envisaged to present a selection of cases to be analysed in this Second Interim Report. The development of the project in search for a clear line of thinking did not yet allow for case studies. Soon after the Second Interim Report the case studies will be carried out.

### 6.2. Scenarios

The scenarios will focus on the main question of this project: what is the influence of management of natural heritage, comparing two possible territorial evolutions:

- Evolution in line with current trends

- Evolution under a scenario of effective protection and valorisation of natural heritage.

To build realistic scenarios the following steps will be taken:

1. Identify the main factors influencing the evolution of the studied system. These factors evolve and interact, causing changes over time;
2. Analyse the possible evolutions of each driving force and their influence on the studied system (creation of **sub-scenarios**);
3. Consider different combinations of sub-scenarios to create **global scenarios**.

The evolution regarding the current trends is based on the mainly economic driving forces, such as urban and infrastructure developments and farming / forestry, consuming space which place great pressure on natural heritage.

The evolution regarding effective management of natural heritage will be based on the following system of influences:

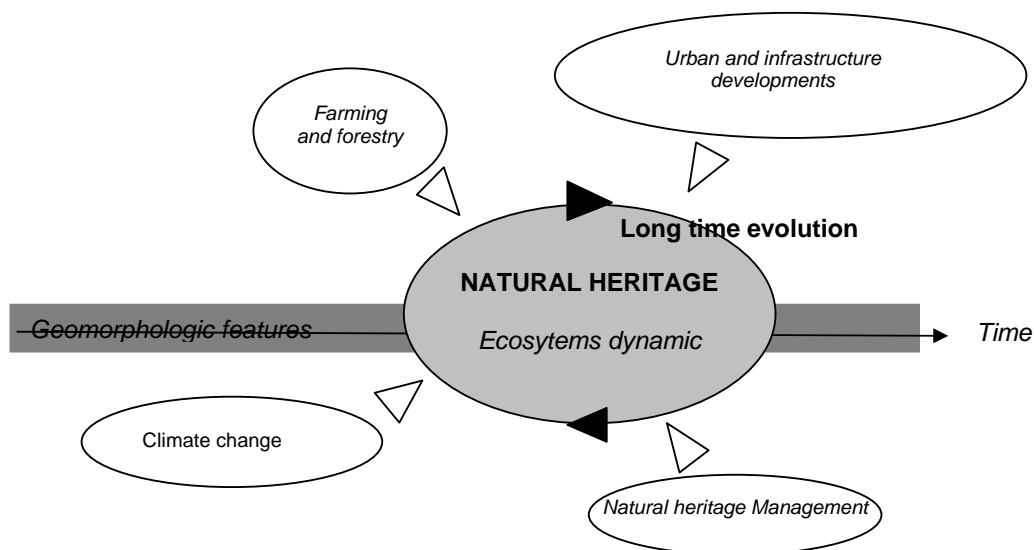


Figure 6.1: Influences on natural heritage

- **The dynamics of the natural heritage** in this view consist of geomorphologic features, climate and the internal dynamics of the natural ecosystem.
- **Farming and forestry** can be external to the natural heritage, determining the space left for natural heritage, or they can be internal to the natural heritage, as agro-dependent ecosystems and forest ecosystems.
- **Urban and infrastructure developments** shape the landscapes and natural heritage structures. They cause fragmentation and soil consumption and soil sealing. These processes have negative impacts such as decreasing potential for food production, increasing run-off and decreasing the area of natural heritage.
- **The management of the natural heritage** influences the natural evolution of the natural heritage through planning regulations, site management and ecological farming incentives.

### 6.3. Questionnaire on management

Next to the case studies on the local and regional level a questionnaire on the national level will be carried out. This activity aims at refining the understanding in the processes of law making and transferring European legislation to the national level. Therefore representatives of national governments and of non-governmental-organisations (NGO's) will be asked to respond to a set of questions with regard to the management of the natural heritage. The kind of information we expect to gather from this activity is complementary to that coming from the analysis of data and the case studies. This questionnaire will be carried during the autumn of this year.

## 7. Natural heritage related to ESDP objectives

One of the explicit questions to be answered in the ESPON programme is about the effect of existing policies on ESDP goals. This means within ESPON priority 1.3.2 more specifically to answer the question to what extent current policies with regard to natural heritage do support to meet the objectives of the ESDP.

The protection and enhancement of the natural heritage is well served by territorial cohesion and by forming an ecological network. In the following section we consider how the main objectives of the ESDP fit with the effects of protection of the natural heritage so far, and what may be the expected effects of successful implementation of Natura 2000.

The main objectives of the ESDP are

- polycentric urban development
- balanced development
- sustainable development

### 7.1. Natural heritage and polycentricity

One of the main spatial objective of the ESDP is to develop or support a Europe wide polycentric urban system. In chapter 3 the policies with regard to the natural heritage are discussed. It is concluded that they address dispersed natural areas. In fact most of them focus on specific natural values, only Natura 2000 aims at a spatial pattern.

Although Natura 2000 is an accepted policy, it has not been in operation long enough to judge its effect on polycentric urban development. It is almost certain that Natura 2000 has not had any influence on the spatial distribution of urban areas. The actual polycentric distribution of urban areas does not seem to be influenced by any policy with regard to natural heritage. If after a period of several decades, Natura 2000 is implemented successfully, resulting in a large network of protected natural areas, then the network may be expected to add to the attractiveness of sites for settling new economic activities. Sites located in proximity to elements of the nature network and good infrastructure may become modal points for potential future polycentric developments. So, Natura 2000 may be expected to have a supportive influence on developing a more polycentric urban system.

### 7.2. Natural heritage and balanced development

The ESDP promotes balanced social and economic development in order to avoid more concentration of economic activities and population in the core area in north west Europe. The distinction in core-periphery has been made in the ESDP by defining the core area as the pentagon area between London, Paris, Milan, München, and Hamburg. This includes the area previously identified to be the zone in which most of the economic activities were developed: the blue banana including London,



Belgium, the Netherlands, the Rhein Ruhr, and the Rhein main development zone connecting via Switzerland with Milan.

Balanced development should promote economic developments and investments outside these parts of Europe. Structural funding through Objective 1 is already strongly enhancing development in the periphery. Ireland, Portugal, Spain, southern Italy and Greece have received substantial support for development. In the near future the accession countries in Central Europe will also be eligible for substantial funding.

The policies on natural heritage as described in chapter 3 do not seem to have had any influence on balancing the development. They also most probably did not have an opposite effect. On the other hand, if Natura 2000 policies eventually result in a Europe wide network of natural areas, this network may offer high quality environments which add to the attractiveness for locating activities outside the core. So, eventually Natura 2000 may support a more balanced development away from Europes pentagon.

### 7.3. Natural heritage and sustainable development

Sustainable development requires equal consideration of social, economic and environmental factors. However, in practice, economic considerations are often given priority. In cases where there is significant local support for retaining an area of open space, more priority may be given to social and environmental factors. Such a strong interest may be the case where biodiversity or a rare species is clearly threatened but also where historic cultural and emotional considerations are at stake. The value that is attributed to specific natural areas by society can be greater if more information is available about its qualities. The value of a specific area can also be greater when it is a strategic part of a larger network, connecting other areas.

The policies with regard to nature conservation and the protection of species have clearly served to strengthen ecological aspects. Nature under threat is defended and that should be continued. No doubt that in general these policies support in general the sustainable development of Europe.

It may be expected that when Natura 2000 has been implemented and a large European network of natural areas has been realised, the value of specific areas is recognised as being a part of a wider network. As a result it also may be expected that threats to specific elements of the network will evoke resistance. It may be concluded that Natura 2000 forms an important policy enhancing sustainable development. Continued implementation should be strongly recommended.

## **PART II: Implementation of a coherent network for natural heritage**

## **8. Enhancing territorial cohesion**

As an important step forward in relation to the management of natural heritage, the commission extended its cohesion policy to territorial cohesion. It includes now territorial cohesion next to social and economic cohesion.

This policy initiative is important for the natural heritage because it provides the possibility to address the effects of the century long processes of erosion and fragmentation of the natural heritage.

### **8.1. Coherence and natural value**

Nature is under threat as a result of the fact that the size of biotopes for individual species and the area hosting ecosystems for interdependent species is decreasing. As a result, biodiversity, representing the richness of species, diminishes and the existence of rare species also decreases.

When areas decrease to a minimal size, just allowing the mere existence of a specific species, the exchange of genetic material is under threat and as a consequence, the health of the coming generations is at stake.

A strong relation exists between biodiversity and the size and spatial configuration of natural areas.

In general, large natural areas suffer less from detrimental external influences such as disturbance by human presence, water and air pollution, and local draining. Natural processes like sedimentation (and erosion), succession of the vegetation, and cycles of nutrients are more likely to occur in a balanced way in large natural areas than in smaller ones. Possible negative effects of surrounding human activities are usually less severe. Larger natural areas are more likely to be self-regulating, and thus more self-sustaining.

Larger natural areas provide habitats for species that have a large 'home range', the area an individual animal needs for daily survival. Larger predators like bears and wolves usually have the largest home range. The size of a population of animals or plants is an important factor in their sustainable persistence over longer periods of time. Large natural areas provide resources for large populations. Large natural areas can consist of combinations of different ecotopes. These complexes of patches with a different structures and different natural characteristics provide habitats for different species on which other species depend.

Apart from the size of natural areas, the spatial configuration of natural areas is also important.

Especially in fragmented landscapes, where natural patches are small and separated by other types of land-use, the connectivity of the patches is an important factor in metapopulation survival. Populations in small natural areas have a higher risk of extermination than those in larger areas. Recolonisation of deserted patches is

necessary for the survival of the population on a larger scale: a changing network of occupied and deserted habitat-patches provides a matrix for the population. At the same time, migration between persisting populations prevents detrimental genetic effects like inbreeding.

Many species rely on seasonal migration for survival. Winter and summer habitats have to be at a distance animals can bridge. For birds and other airborne migrators the landscape in between is of little importance. For migratory mammals, amphibians and other species, the connectivity of the landscape is an essential factor in this seasonal migration. A similar process works at a smaller scale in highly fragmented landscapes. The home range of many animals consists of scattered patches of natural area in a surrounding of agricultural or built-up zones.

Therefore there is an important ecological interest in stopping the process of decrease of natural area and fragmentation. Instead of that, the process should be changed in increase of natural area and enhancing the territorial coherence between the separated natural areas.

As such, increasing the total size of natural areas has its positive effects but a larger effect may be expected if added areas are located on spots where they connect two separated natural areas. The objective is to develop a network rather than one large area. Therefore, the selection of sites which actual land use is to be modified into natural areas, should be done carefully, considering its strategic contribution to the development of a network of natural areas. In order to meet this objective, sites that may provide corridor and stepping stone functions within a network of natural areas should be designated, as well as sites of special biological value.

## 8.2. Natura 2000

Protection of the natural heritage requires actions that result in larger natural areas that provide space for more species and species higher in the biological hierarchy. A network of interconnected areas of natural value is expected to support biodiversity as part of an ecological system. This acknowledges the effect of a network of areas forming together one coherent ecological system that is more or less comparable with the effect of substantial increase in the total natural area. Such an extended area offers biotopes for more species and increases the biodiversity. Also exchange of genetic material between individuals of one species is increased, thus resulting in stronger / more healthy individuals.

The EU policy initiative Natura 2000 aims to form such a network of protected natural areas throughout Europe, by connecting Special Protection Areas (SPA) and Special Areas for Conservation (SAC) designated under the Birds and Habitats Directives.

This ambitious policy responds to the general feeling of nature-under-threat and the awareness of the essential value of the natural heritage for mankind.

Natura 2000 promotes different actions with territorial consequences in order to meet the objective of enhancing the ecosystem:

- Increase the area under protection. This may include actions such as the decision to establish various degrees of protection or even to acquire land for establishing a natural area.
- Establish buffer zones. These aim at maintaining a distance between a vulnerable protected area and polluting activities by designating buffer zones for non-polluting activities.
- Establish corridors. Corridors are to be identified and implemented between two separated areas of natural value, connecting them. This does not always necessarily require direct physical connections, especially for birds. Often stepping stones will offer sufficient support to movement and migration patterns.

The policy responses as are formulated in the ESDP and Natura 2000 aim at enhancing the natural heritage by influencing the process in such a way that the actual sequence of events leading to decrease of area and fragmentation stops and a new process starts leading to more coherence. The illustration describes how policy and management establish new driving forces, establishing pressures on the actual state, resulting in desired outcomes.

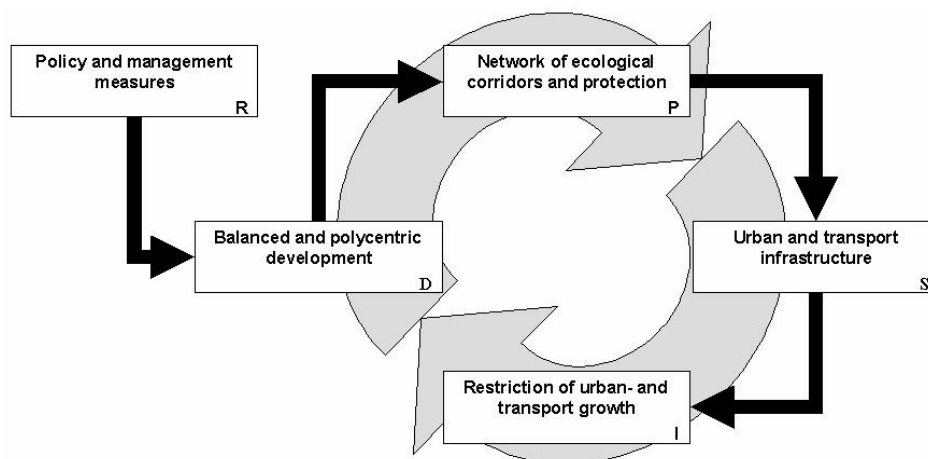


Figure 8.1: Policy towards cohesion

In the figure these relations are expressed in the causal configuration using the DSPIR model:

- Policy response: - creation of an ecological network
- Driving forces: - balanced and sustainable development
- Pressure:
  - increase of natural area
  - ecological corridors
- State:
  - spatial pattern, urban and transport infrastructure
- Impact:
  - restrictions on urbanisation
  - enhancement of ecological coherence

### 8.3. Ecological network and rural policy

The national governments and the European Commission acknowledge the problems of the natural heritage caused by the century long spatial developments leading to decrease of area and fragmentation. The initiative Natura 2000 seems to be the appropriate answer aiming at adding extra areas and at building a network. The implementation of Natura 2000 consists of changing an existing rural function into nature. Within Europe, agricultural use is the main land use, therefore it is likely that much of the area to be designated as natural areas will be land from previous agriculture land use.

Therefore the territorial effects of agricultural developments and agricultural policies are relevant for further consideration. These will be considered in the next chapter.

In order to enhance the coherence of a network of natural areas, sites must be selected for protective measures or even acquisition. This should be done in a very responsible way taking into account all relevant interests in the rural areas. This can best be carried out in the framework of spatial planning activities at the regional level.

## 9. Rural developments

The creation of an ecological network, as defined in Natura 2000 and supported by European policy, implies shifts in land use towards natural land uses. As it is quite unlikely that substantial built-up areas be changed into natural areas, the most likely source of land to be reverted to natural habitats is the open space, in the rural areas. Open space provides land which uses are to be reverted in natural land uses in order to contribute to the ecological network as natural core areas, stepping stones or corridors.

In this chapter, rural developments are described in the perspective of the creation of an ecological network.

### 9.1. Open space in spatial development

The continuous process of urbanisation by city extensions, with residential and economic zones and by building infrastructure seems to be unlimited, especially in regions with high development pressure. The dominance of city extensions for new developments over intensifying urban areas is due to the fact that in practice it is easier to implement projects in well accessed sites outside the cities and more difficult to regenerate old existing sites in an urban environment.

Serious limitations to city expansions are only perceived where large geomorphologic features like steep mountain slopes or large water entities constrain opportunities for outward expansion. It is arguable that legal planning regulations are insufficient to limit the extension of cities. In practice, actual needs of local societies will result in adapting the planning regulations thus enabling developments. The decision-making processes at the local level often show that economic forces dominate over forces arguing for the protection of the natural heritage.

In general, the impression arises that all open space is considered to be potential building sites.

So, the challenge for EU policy with regard to natural heritage is to improve the balance between economic and ecological considerations as perceived at the local level.

### 9.2. Agricultural developments

Agriculture throughout Europe is facing a range of pressures, for example from changes in world markets and changes in the Common Agricultural Policy. Evidently these changes will affect different farming systems in different ways, depending on the crops grown and livestock reared.

Agricultural systems are directly related to geophysical conditions including soil type, water level, and climate. The severity of economic problems vary according to local,

regional, national, EU and global factors. Data on which agricultural systems and areas are most under threat, would provide a very useful input for this ESPON project. This would allow to identify areas where a change from agriculture to natural habitats would be most likely and possible.

Agricultural developments are anyhow essential to spatial developments on the regional level. Small scale and biologic methods of production are less destructive to the landscape and the quality of the environment. The combination of activities related to agricultural production and maintaining landscape qualities still provides possibilities for enhancing the natural heritage.

### 9.3. Landscapes

The strong interrelation of agricultural activities and the physical geography has developed into visually recognisable entities that reflect the historic processes of human activities in relation to the geomorphologic conditions. These entities, usually called landscapes, include natural as well as cultural values. Here the combination of agricultural activities with natural conditions results in characteristic identities showing the typical European variety of cultures. The protection of cultural heritage in Europe should include the protection of landscapes as being long term expressions of human activities. It may be clear that for the protection of the cultural variety a large overlap with the protection of natural heritage exists.

There may be conflicting interests between the maintenance of landscapes and the requirements of modern farming. The EU, acknowledging the importance of landscape protection supports those farmers that accepted limitations in their activities.

An accepted European typology for landscapes has not yet been developed.

### 9.4. Elaborating Natura 2000

It must be emphasised here that the initiative Natura 2000 is a very promising policy that should be continued and enforced. Stronger integration into general rural policies would enhance its effects.

A sustainable rural policy that widens the scope of the Leader programme would be advisable. Such a policy should integrate policies with regard to the scarce resource of open space, agriculture, nature and culture aiming at the same time at sound economic future of the region and the construction of an ecologic network of natural areas. The progress of the Natura 2000 policy should be evaluated in order to identify improvements to its effectivity.



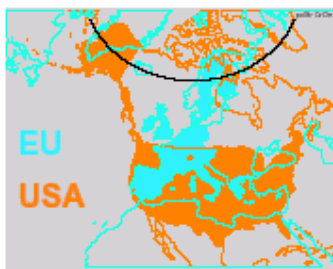
## 10. European territorial structure

Territorial cohesion with regard to the natural heritage leads to the building of a network of natural areas. As natural values are strongly related to the physical structure, the existing physical structure of Europe should be used as a main frame for this network, acknowledging the fact that the historic situation cannot be restored.

To be able to use this physical structure as a main frame, it is necessary to understand the overall system. A description will be given in this chapter.

### 10.1. Close relation to the sea

A striking characteristic of European geomorphology is the important role of the coast. The European coastlines of the Mediterranean, the Atlantic, the North Sea and the Baltic Sea are extremely strongly profiled and carved out. In comparison with other continents the ratio of coastline to total surface is significantly higher (Figure 10.1). Europe has by far the greatest length of coastline per inhabitant; 60% of Europeans live in coastal areas.



**Figure 10.1: Comparison of coastlines in Europe and USA (ESDP)**

The form of the continent is clearly reflected in the great diversity of landscapes in Europe. The European continent consists of many different peninsulas, leading to diverse landscapes and natural values. This structure also has led to cultural differences in these regions. With regard to the natural heritage the importance of Integrated Coastal Zone Management (ICZM) must be stressed. It concerns an integrated approach involving all relevant interests and actors. The elaboration of Natura 2000 and other management options with regard to the natural heritage should in coastal zones be harmonised with the ICZM activities.

### 10.2. Hydrological system

Not only does Europe have a relatively long coast, it also has an extensive network of rivers and inland waterways.

The physical structure of Europe is strongly characterised by the high mountain ranges in the southern part of Europe and in Scandinavia and middle mountains and plains between the Alps and the coastal zones to the north and the west.

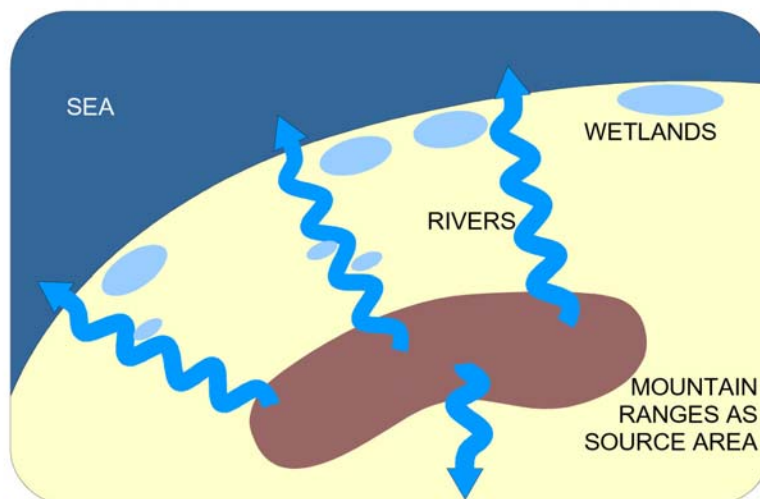


DIAGRAMME: MAIN STRUCTURE OF EUROPE

The large west-east oriented range of the Cantabrian mountains, the Pyrenees, the Alps and the Carpatian mountains forms the 'backbone' of Europe. At the north Spanish coast and the Mediterranean coast, the mountains are abruptly broken off by the sea. Along the Atlantic, the North Sea and the Baltic Sea, large coastal areas form low lying plains, gradually reaching sea level. These low lying zones to the west and the north cover large areas of France, the Low Countries, northern Germany, Denmark, Poland and the Baltic countries. The coastal zones and the central range of high mountains are connected by the large European rivers, thus forming a Europe wide hydrological system.

This hydrological system largely has its resource area in the mountain zones and its deposit area in the western and northern coastal zones. So, important physical coherence in Europe is provided by the hydrological system.



in terms of natural heritage and structure is of essential importance. There is a coherent system of sources of clean water flowing through rivers, rivers transporting the water and nutrients to the coastal deltas. In this way the concentrations of European natural heritage are connected; natural areas in the mountain ranges are connected to the wetlands along rivers and in coastal plains.

Efforts to enhance the territorial coherence of Europe should use this system as a coordinating framework, in which enhancements can take place.

### 10.3. Importance of the hydrological system for the ecological network

When building a network of natural areas such as Natura 2000 aims for, the above described physical structure should be considered. The location of a specific natural

area should always be considered within the existing physical structure of Europe in order to enhance the value of the ecological network.

As many actions following from the Water Framework Directive have spatial consequences, for instance space needed for upstream buffering of water, widening river beds mid-stream and space for retention down-stream, this provides opportunities for building an ecological structure. In this combination of EU policies, mutual benefits can be created for both sectors.

## 11. Regional typology

ESPOON wishes to define regional typologies that can be applied when examining submissions for financial support. Such a typology should allow consideration of submissions with regard to criteria that reflect relevant policies. The result of European funding eventually must be a stronger socio-economic and territorial cohesion. Equity and equal opportunities are essential elements for coherence, but also important values like physical and mental health, cultural identity etc. should be respected. Therefore the tension between prosperity and regional culture should be regarded.

### 11.1. Valuable differences

GDP as being the important criterion for Objective 1 funding does not take into account aspects of cultural identities as they vary per region. The concentration of economic activities in the core area, together with employment and relatively high GDP are subject to the policy of balanced development aiming at distributing economic growth to peripheral areas outside the core. It is a challenge to distribute economic activities over Europe in such a way that it does not result in levelling out local and regional differences. The large variety in cultures and landscapes of Europe is at the one hand a weakness of Europe, which is addressed by the policy of coherence but at the same time it is an important quality. Its large variety adds to Europe's attractiveness not only for visitors but also for its large variety of economic activities producing regional quality products. These differences are important for the large economic sector of tourism but may also enhance the innovative climate of Europe.

### 11.2. Position in the macro structure

A typology of regions with regard to the natural heritage should take into account the location in Europe's macro structure. The essential elements of the physical structure, being the mountainous areas and the coastal zones, together with islands, are at the same time regarded in economic terms as the handicapped areas. As a result, those areas should on the one hand be safeguarded for the value of their natural heritage for the whole of Europe and on the other hand these values are seen as handicaps for developing an equal GDP.

As a result, in those areas European support should be focussed on safeguarding the natural heritage as well as on enhancing the economic activities. That requires extra attention to these elements of the macro level, which should be reflected in a regional typology.

### 11.3. Natural cultural values and economic development

Variety of cultures is felt to be a basis for innovative climate, such as required to meet the Lisbon objectives aiming at situating Europe in the highest rank of innovative and high-tech economies. Therefore the development of cultural values also may have an economic value. Different approaches in different environments can result in creative solutions. Also the relation between natural heritage and economic activities should be considered. A healthy natural environment may be an important factor for locating specific activities like high-tech production in different fields, research and development, health care, university institutes, and cultural production. A coherent network of natural areas such as Natura 2000 envisages, may secure this type of environment in several places. This may provide at the meso and micro level sites with quiet and healthy images that enhance innovative activities.

#### 11.4. Balanced decision making

Decisions about the development of specific sites should be considered within the context of the region.

Balanced development should therefore consider interventions within a wider socio-economic structure as well as in the context of natural and cultural heritage. This might be seen as confronting two physical structures at the meso level:

1. The social and economic structure of a polycentric urban system connected by infrastructure.
2. The natural and cultural heritage structure of a network of natural areas, partly connected by rivers, and landscapes.

A typology of regions should take into account the location of regions within these regional structures as well as in relation to the macro structure as has been described in chapter 10.

In their confrontation interesting and promising opportunities will exist. Specific economic activities may develop as a result of both the position and connections of a specific site in the polycentric urban system and the position in a characteristic landscape with specific natural values.

#### 11.5. Typology

### ESDP structure

### Proposed regional typology

<b>Macro</b>
Handicapped areas
Core
Outside core

<b>Macro</b>
Physical and socio economic structure
Mountainous regions with high development pressure
Mountainous regions with low development pressure
Smaller islands with high development pressure
Smaller islands with low development pressure
Coastal zones with high development pressure
Coastal zones with low development pressure
Other regions with high development pressure
Other regions with low development pressure

On the macro scale, the proposed classification is based on the combination of the main physical structure and the main socio economic structure of Europe. This classification is in accordance with the ESDP typology of core, outside core and handicapped areas. It would be ideal to elaborate one integrated spatial framework for Europe, including the existing ecological, cultural, economic and social structures.

contribution to territorial coherence		
Coherence on macro scale	Regional structures on meso scale	Possible contribution to the coherence on macro scale
Ecological coherence	Ecological network	Essential contribution
		Contribution
		No contribution
Cultural coherence	Cultural structure	Essential contribution
		Contribution
		No contribution
Economic coherence	Economic structure	Essential contribution
		Contribution
		No contribution
Social coherence	Social structure	Essential contribution
		Contribution
		No contribution

On meso scale, regional structures can be recognised. These regional structures should be evaluated on their possible contribution to the European Cohesion policies and how they fit in the main framework.

Regional spatial development visions should be elaborated to ensure integration of sectoral structures in such a way that they contribute to the Cohesion policies. In the process of elaborating these regional visions, existing structures will be identified and possibilities to enhance and complete the structures will be proposed.

Micro scale	
Regional structures on meso scale	Possible contribution of projects to the regional structures on meso scale
Ecological network	Essential contribution
	Contribution
	No contribution
Cultural structure	Essential contribution
	Contribution
	No contribution
Economic structure	Essential contribution
	Contribution
	No contribution
Social structure	Essential contribution
	Contribution
	No contribution

On micro scale, projects will be evaluated, according to their contribution to the four individual sectoral structures. Examples of projects are the development of a natural area, renovation of an old industrial site, sanitation of a polluted area, support for increase in employment in an area or the building of infrastructure.

This decision for financial support should be based on equality of the various sectoral interests.

## **12. Appendices**

- 12.1 Maps
- 12.2 Indicators
- 12.3 Integration of the Crete Guidance Paper
- 12.4 Actions towards other TPG's
- 12.5 SWOT analysis
- 12.6 Explanations of the analyses
- 12.7 Questionnaire on management
- 12.8 Case studies and scenarios



## 12.1. Maps

### Appendix I MAPS, data and indicators

#### **Introduction**

A number of maps have been included in the second interim report to support the line of reasoning. As mentioned in the first chapter, key project questions have been discussed reformulated. Accordingly the map to be produced has changed since the FIR. Also, analyses of maps and data are still continuing. For the overseas areas and Scandinavia for example not all data has been included as yet. This will be finalised during the next phase. An overview of the actual state of species richness, based on Worldmap (grid 50 x 50 km), was anticipated to be included in the current report. Unfortunately this data has not been received as yet and will be included in the next report.

One of important aspects to be covered concerns fragmentation of natural areas. From the analyses it has been concluded that for example due to defensive designation policy, up to recently, widespread fragmentation in many areas has taken place. In order to define future policy it is essential to map this fragmentation. However, there is still discussion among the project team on the most appropriate way to compute and display fragmentation. A first attempt is included in this appendix. It shows an index including average size of natural area patches and patch density.

Also in the next report it is anticipated that the following analyses maps will be included:

- the actual state of species richness, based on Worldmap (grid 50 x 50 km),
- Potential for future nature protection, minimum size of natural area patches, distance between neighbouring patches and barriers (such as roads, traffic densities, canals, high speed trains)
- Distribution of found categories of management practices.
- Further analyses of fragmentation
- Mapping of case studies and scenarios

#### **Description of maps and data**

The following table gives an overview of the maps included in the report with a short description of sources. The final report will report on further details of used data and maps.

Nr.	Content	Data	Source	period	scale
2.1	Percentage built up area for Nuts3 regions	Corine, Nuts 3 regions	EEA – ESPON database	1986-1996	25 ha
2.2	Population density for Nuts 3 regions	Population, Nuts 3 regions	Eurostat, EEA – ESPON database	1999	Nuts 3
2.3	Population growth for Nuts 3 regions	Population, Nuts 3 regions	Eurostat, EEA – ESPON database	1995-2000	Nuts 3

2.4	Percentage of agricultural area for Nuts region	Corine, Nuts 3 regions	EEA – ESPON database	1986-1996	25 ha
2.5	Distribution of semi-natural areas	Corine	EEA – ESPON database	1986-1996	25 ha
2.6	Percentage natural area for each Nuts3 regions	Corine, Nuts 3 regions	EEA – ESPON database	1986-1996	25 ha
4.1	Location of Ramsar sites	Ramsar sites	Ramsar convention	2000	Point
4.2	Distribution of designated natural areas	Location of protected area	UNEP WCMC, IUCN World Commission on Protected Areas	1997 edition	Point
4.3	Distribution of designated natural areas in different periods of time	Year of designation	UNEP WCMC, IUCN World Commission on Protected Areas	1997 edition	Point
4.4	Mean size of designated areas for each Nuts 3 region	Corine, Nuts 3 regions	EEA – ESPON database	1986-1996	25 ha
5.1	Percentage of built-up area and mean size of designated natural areas for Nuts regions	Corine, Nuts 3 regions, size and location of protected area	EEA – ESPON database UNEP WCMC, IUCN World Commission on Protected Areas	1986-1996 1997 edition	25 ha Point
5.2	Percentage of natural area and percentage of designated natural area for Nuts regions	Corine, Nuts 3 regions, size and location of protected areas	EEA – ESPON database UNEP WCMC, IUCN World Commission on Protected Areas	1986-1996 1997 edition	25 ha Point
app	Fragmentation index	Corine, Nuts 3 regions	EEA – ESPON database	1986-1996	25 ha

#### *Map 2.1*

The map gives an overview of the share of area devoted to built up area for each NUTS 3 region. The data used comes from the Corine program (Co-ordination of Information of the Environment CLC). The program was proposed in 1985 by the European Commission, aimed at gathering information relating to environment on certain priority topics for the European Union (land cover, Coastal Erosion, Biotopes, etc.). This mapping is based on the manual interpretation of the 1:100,000 scale Landsat TM and SPOT HRV images. The smallest areas mapped are of 250\*250 m pixels (25 ha). A new 2003 version is expected in 2004. For each region the percentage built-up was computed with classes (0-2, 2- 5, 5-10, 10-20, 20-50, 50-100)%

#### *Maps 2.2 and 2.3*

To support the arguments on development pressure both current population density and growth has been mapped for each Nuts 3 region. The data originates from

Eurostat. The maps clearly show those areas with high population densities and growth, where it is assumed that natural area is under pressure.

#### *Map 2.4*

The map gives an overview of the share of area devoted to agricultural area for each NUTS 3 region. The map shows the coverage of the agricultural area, but does not describe the type of agriculture. Agricultural area is important in terms of open spaces and might for example in case of extensive farming be associated with natural area.

#### *Map 2.5*

This map gives an overview of landcover with special reference to the distribution the natural areas and forest on a Pan European scale, where landcover gives an (bio) physical description of the earth's surface. The map shows the extent of natural areas and forest, but does not describe the type of natural area, use or value. The classes mapped represent Corine level one identifying urban fabric, industrial, agriculture, forest and semi-natural area, wetlands and no data.

#### *Map 2.6*

This map gives an overview of the share of area devoted to natural area and forest for each NUTS 3 region. For each region the percentage cover of natural area and forest was computed with classes: 0-2, 2- 5, 5-10, 10-20, 20-50, 50-100%.

#### *Map 4.1*

The map shows the distribution of Ramsar sites based on the current Ramsar convention list of protected wetlands. Although only the locations of the sites have been depicted the data also contains year of designation and size.

#### *Maps 4.2 and 4.3*

Map 4.2 presents the list of designated area as defined by IUCN, while map 4.3 presents an historical overview of year of designation. The IUCN has developed a preliminary system to categorise protected areas based on management aspects. The IUCN General Assembly approved the categories in 1994, for which the definition is as follows (The IUCN Protected Areas Management Categories, Information sheet 3, Cardiff University). The protected areas are categorised according to their primary management objectives, and not the success of effectiveness of protection. Also the categories are of equal importance and are neutral about the managing agency or landowner. The next edition of the *UN List* will be released in 2003.

Classes designated areas:

- Ia: Strict nature reserve/wilderness protection area managed mainly for science or wilderness protection
- Ib: Wilderness area: protected area managed mainly for wilderness protection
- Category II: National park: protected area managed mainly for ecosystem protection and recreation
- III: Natural monument: protected area managed mainly for conservation of specific natural features
- IV: Habitat/Species Management Area: protected area managed mainly for conservation through management intervention
- V: Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation or recreation

- VI: Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural resources

For time of designated the following classes have been used: <1930, 1930-1940, 1950-1960, 1960-1970, 1980-1990, >1990

#### *Map 4.4*

This map gives the mean size of the designated areas for each Nuts3 region. For the computation of percentage designation is the inter-region extent of designated areas not taken into account.

#### *Map 5.1, 5.2*

Map 5.1 gives the Percentage built up area and the mean size of the designated areas for the Nuts3 regions, while map 5.2 gives the percentage natural area and the percentage of designated natural area for Nuts3 regions. Map 5.1 attempts to relate development pressure, such as percentage built-up to designation to designation. Map 5.2 illustrates whether there is a relation between extent of natural area and designation. For the computation of percentage designation is, the-inter region extent of designated areas not taken into account.

#### *Appendix*

This map shows a first attempt to compute an appropriate fragmentation index. As stated before, this index will be further developed. The current index combines percentage natural area coverage and the patch density. Continuation of patches from one region to another was not taken into account. The surface of the earth consists of landscape mosaics that are mixtures of natural and human managed patches that vary in size, shape and arrangement. Each patch represents a surface area differing from its surrounding, thus inferring a discrete and internally homogeneous entity. Homogenous patches do rarely occur in nature; instead, hierarchical mosaics of patches within patches occur over a broad range of scales. This infers that heterogeneity may vary with scale. The scale of patches extends from the oceans and continents via the scale of individual plants to the leaves. At each scale homogeneity can be assumed if the internal variance is not significant for the process under description. In the case Corine data, the origin is satellite data, where the finest scale is the pixel of size 25\*250 m. This pixel is considered internal homogenous with discrete boundaries. Both number and average area of natural area patches only give an indication of fragmentation.

## 12.2. Indicators

### **Appendix II Indicators**

The indicators are part of the conceptual framework and will be crucial for monitoring and description of typology The First Interim report discussed indicators territorial trends of the natural heritage by analysing the questions that are included in the title of the project and the descriptions of ESPON priority 1.3.2. The First Interim Report resulted in a list of 13 key questions, sub-questions, related data sources and indicators to be further analysed. During the process of compiling the Second Interim Report, the questions were further looked at and discussed. This has led to a fewer number of questions and related indicators. The selection of relevant indicators in relation to each question/sub-question was based on the following principles:

- Which combinations of questions and indicators are relevant for the objective and aims of the project?
- Which combinations lead to analyses that can be made operational?
- Is data available?

The following table gives the research questions and the indicators to be used to answer these questions:

Research questions	Indicators
Development pressure	
<ul style="list-style-type: none"> <li>Spatial extent of development pressure</li> </ul>	<ul style="list-style-type: none"> <li>Extent of built-up, population density, -growth</li> </ul>
<ul style="list-style-type: none"> <li>Extent and trends of agricultural coverage</li> </ul>	<ul style="list-style-type: none"> <li>Corine Agricultural coverage and changes in agricultural area</li> </ul>
<ul style="list-style-type: none"> <li>Designation of natural areas</li> </ul>	<ul style="list-style-type: none"> <li>Distribution of IUCN and RAMSAR designated areas</li> </ul>
<ul style="list-style-type: none"> <li>spatial extent of designated areas</li> </ul>	<ul style="list-style-type: none"> <li>Statistics of designated areas for Nuts3 regions</li> </ul>
<ul style="list-style-type: none"> <li>trends in designation</li> </ul>	<ul style="list-style-type: none"> <li>Year of designation</li> </ul>
<ul style="list-style-type: none"> <li>relation between designation and landscape types</li> </ul>	<ul style="list-style-type: none"> <li>Correlation between landscape types and designated natural areas</li> </ul>
Development pressure and designation	
<ul style="list-style-type: none"> <li>correlation between pressure and number of designated areas</li> </ul>	<ul style="list-style-type: none"> <li>Index for pressure, based on area built-up, population statistics correlated to number of designated sites for each Nuts3 region</li> </ul>
<ul style="list-style-type: none"> <li>correlation between trends of urbanisation and designation</li> </ul>	<ul style="list-style-type: none"> <li>Changes in urbanisation and year of designation</li> </ul>
<ul style="list-style-type: none"> <li>correlation between designated areas and TEN</li> </ul>	<ul style="list-style-type: none"> <li>Designated areas and TEN</li> </ul>
Fragmentation of natural areas	
<ul style="list-style-type: none"> <li>Extent of fragmentation</li> </ul>	<ul style="list-style-type: none"> <li>Index based on patch density and average patch size for Nuts3 regions</li> </ul>
European management policies	
<ul style="list-style-type: none"> <li>EU management measures that aim to reduce the pressures of urbanisation on vulnerable and sensitive areas</li> </ul>	<ul style="list-style-type: none"> <li>Results questionnaire</li> </ul>
<ul style="list-style-type: none"> <li>Relationship between the management of specific landscape types and urban settlement</li> </ul>	<ul style="list-style-type: none"> <li>Results questionnaire</li> </ul>
<ul style="list-style-type: none"> <li>Prevention and influence of protection of natural areas by EU and national policy on urban development</li> </ul>	<ul style="list-style-type: none"> <li>Results questionnaire</li> </ul>
<ul style="list-style-type: none"> <li>Influence of investments in natural areas on the development of biodiversity and total and average size of natural areas</li> </ul>	<ul style="list-style-type: none"> <li>Results questionnaire</li> </ul>

12.3. Integration of the Crete Guidance Paper

12.4. Actions towards other TPGs



## 12.5. SWOT analysis

Questionnaire:

Relevant policy options for the natural heritage project found in the ESDP are:

(40) Continued development of European ecological networks, as proposed by Natura 2000, including the necessary links between nature sites and protected areas of regional, national, transnational and EU-wide importance.

(41) Integration of biodiversity considerations into sectoral policies (agriculture, regional policies, transport, fisheries, etc) as included in the Community Biodiversity Strategy.

(42) Preparation of integrated spatial development strategies for protected areas, environmentally sensitive areas and areas of high biodiversity such as coastal areas and wetlands balancing protection and development on the basis of territorial impact assessments and involving the partners concerned.

1. In the light of the policy aims of the ESDP: What are the main **strengths** identified by your TPG?

- Many natural heritage areas have already been protected, especially in high pressure areas and mountainous areas and wetlands
- A first attempt for a mapped ecological network does already exist (mapped) for Central Europe (Pan European Ecological Network)
- An important step towards a pan European ecological network for EU15 is made by the start of Natura 2000, this should be harmonised with the PEEN in Central Europe
- Natural areas in or near cities often have a special, protected status because of its importance for the population
- Accessibility and availability of natural areas is an important factor for the attractiveness of an area for settling.

2. In the light of the policy aims of the ESDP: What are the main **weaknesses** identified by your TPG?

- The importance of natural heritage for human well-being and settlement is often neglected in day to day practice
- Natural heritage seems to be of minor importance compared to other (economically relevant) land uses, such as urban development and infrastructure in planning decisions
- Natural heritage seems to be protected often not (only) because of its intrinsic value, but also because of other circumstances, such as incidental availability, areas known for some reason to the population, etc.
- Many protected areas are separated and fragmented, therefore habitats for many floral and fauna species are too small.



3. In the light of the policy aims of the ESDP: What are the main **opportunities** resulting from the identified frame conditions?
  - Natural heritage should become a factor of higher priority, counterbalancing economically driven factors
  - As a step towards a stronger position of natural heritage the pan European ecological network could be developed, serving as a guideline for planning decisions on the smaller scales and supporting territorial coherence
  - This ecological network could at the same time play an important role in enlarging habitats thus serving biodiversity
  - A set of guidelines can be developed for planning decisions, taking account of different factors, such as a-biotic and geomorphologic features, biodiversity, economic potential, etc.
  - Natural heritage should be more pronounced as an important factor for human well-being as well as for offering excellent conditions for settling new, non polluting economic activities.
  
4. In the light of the policy aims of the ESDP: What are the main **threats** resulting from the identified frame conditions?
  - There is the risk that although the ecological network and planning decision guidelines, are implemented, natural heritage will remain an issue of minor priority in planning practice if its interests are not sufficiently included in integrative approaches
  - Since the (economic) value of natural heritage is less acknowledged than this is of other land uses, such as urban development and infrastructure, the risk of giving lower priority to natural heritage in planning decisions remains
  - The gradual disappearance of extensively used agricultural areas, which provide a potential for enlarging natural habitats and for corridors between natural areas should be avoided.
  
5. Looking back on the questions 1) to 4): What are the 3-4 driving forces dominating the thematic sector?
  - Natural heritage is not a force in itself. Driving forces are the acknowledgement of the value of natural heritage, which can be divided into the following factors:
    - acknowledged value of high biodiversity
    - acknowledged value of an area as for urban green recreation
    - acknowledged value for rare species
    - emotional value of an area known for a certain reason by the public
  - Protection of natural heritage by official organisations and NGO's
  - Development pressure as a threatening factor for natural heritage evokes defensive reactions.

from FIR:

Starting from the project's key question 'What is the influence of the management of natural heritage on territorial trends?' one can identify the components of the DPSIR framework from two different angles that are linked through the responses from policy makers and society.

In the first perspective the urban and transport infrastructure is the central component on which driving forces and pressures (for example from nature conservation

measures) have an impact. In the second perspective the natural heritage has a central position and drivers and pressures impact upon it (for example through increase of urban density). Figure 1.2 in the First Interim Report provides a schematic presentation of the relationship between these two perspectives, which are linked via the responses from society and policy. These management responses are pro-active in terms of spatial development objectives (as included in the ESDP, left side of figure) and re-active in terms of defensive management actions protecting the natural heritage (righthand side of the figure).

6. Commencing from these driving forces please develop a typology which can be used to classify the European regions.

Classification on which to base planning decision rules:

- based on landscape/geomorphologic types (river basins, mountains, coastal zones)
- high/low development pressure classification
- economic potential classification
- important/not important natural heritage classification (based on biodiversity, landscape value)
- important/not important as urban recreational area (measure by minimum required green area compared to population)
- important for other reasons

Provisional first attempt for typology for European regions:

Each region to be characterised by two pairs of factors, two scale levels. The two pairs of factors aim at balancing spatial development by relating natural/cultural value to socio/economic potential as follows:

Each region			
Macro scale		Meso scale	
Natural value	Development pressure	Natural value	Development pressure
Relation to large geo morphology	In/or outside pentagon	Classification of protection and cultural value	Nearby large cities Highly accessible, but away from core

7. Please map the spatial pattern emerging from this typology of main driving forces.

This is not (yet) possible

8. Please prepare a data set which contains the data of the driving forces and the regional classification. Driving force:

- number of protected areas
- total size of protected areas
- biodiversity in total rural area

9. Refer to the concept of sustainable development and regional competitiveness. Please describe on a half page how the spatial pattern and developments (or: innovative elements of policies – see example on the right) in your sector outlined above, relate to sustainable development and balanced competitiveness as overall aims in the field of spatial development and EU policies.
10. Please name for both aims the three or four most important indicators you use to measure and assess these trends
11. Refer to sustainability and its economic, social and ecological dimension: Please give an intuitive assessment to what degree the spatial patterns in your sector comply with the three dimensions of sustainability.

9/11. The existence of areas of natural heritage offering a large biodiversity and healthy environments form essential components of a sustainable development. Enhancing these areas by building a Europe wide network will further support sustainable development.

The ecological component of sustainable development is strongly supported by enhancing biodiversity and protecting and enlarging biotopes. So, successful management of the natural heritage serves sustainability. The social element is also strongly supported by a strong structure of natural areas. They offer potentials for recreational and tourist activities, provided that the related facilities do not threaten the ecological quality. A well managed natural heritage also may be very supportive to the (cultural) identity of a region.

The economic component is not only represented by the tourist activities, which have in some areas a large impact. Also for settling new economic activities, that are more or less foot-loose and fitting in tranquil environments that offer a healthy image, a natural setting is attractive. The regional competitiveness may be strongly enhanced by successful management of the natural heritage. An attractive healthy landscape will add to the positive image of such a region.

Business parks for business to business services, research and development activities and high tech-production belong to the economic sectors that look for those qualities. The availability of attractive housing and an excellent accessibility are preconditions for competitive cities and regions. Locations, which are away from derelict industrial sites, and are situated near large cities and their facilities will be most attractive. A more balanced development might occur if location is promoted outside the large urbanised concentrations, at crossings and exits of large infrastructure. The development of specific nodes can be stimulated along elements of the TEN outside the pentagon.

12.6. Explanations of the analyses

12.7. Questionnaire on management

### QUESTIONNAIRE

1. Is your environmental and spatial planning legislative framework aligned with EU's corresponding framework? If no how does it differ?
2. What constitutes the legislative framework for the protection of natural areas?  
*Register main relevant acts, regulations etc.*
3. Protection and/or management of natural areas is sole responsibility of one Ministry /Agency? If no how many Ministries/Agencies are involved and with what responsibility each?
4. What constitutes the natural heritage of your country or region?  
*Register both biotic and a-biotic features you perceive as natural heritage*
5. Which are the main threats and pressures to the natural heritage of your country / region?
6. Is the protection of your country's natural heritage integrated into the spatial planning system of your country?
7. If the answer to question 6 is YES, please tell us how the protection of your country's natural heritage has been integrated into the spatial planning system of your country?
8. What are the main goals formulated in your National Planning System in relation with Natural Heritage?
9. How does the monitoring of the above formulated goals is being achieved?
10. What is the surface area of natural areas in your country or region?  
*By natural area we mean any unpaved area, or in other words ground which is not occupied by urban development (e.g settlements) and technical infrastructure (e.g transportation-energy networks, etc).The information concerns natural areas at different spatial scales e.g national parks, regional, local parks, special protection areas, wetlands, river valleys, mountainous and coastal areas, green belts around urban areas, agricultural land, forests, etc*
11. What are the number, type, location, protection status, and surface area of protected natural areas in your country or region?  
By protected area we mean any area that is being under special legal status of protection due to special biotic and a-biotic characteristics.
12. What are the number, type, location, and surface area of protected natural areas under management plans in your country or region?

13. Which land uses are permitted in protected areas in your country / region?
14. Resource allocation and funding source for nature conservation, land rehabilitation and land acquisition for protection in your country or region. Please also quote the % of the National or Local budget.  
*We are interested on the amount spent per category on the last three years as well as on 1970 and 1990 for nature conservation, land rehabilitation, and land acquisition for protection*
15. What is the surface area of land acquired for natural protection in your country / region?
16. Are there any incentives and grants utilised for nature protection in your country or region?  
*Financial aid may be offered directly or indirectly (e.g aid to farmers to reforestation, or for soil erosion prevention). Both types are of equal importance.*
17. Please contribute with any comment that you wish, that you believe should be mentioned in relation with the research subject.

**AGENCY COMPLETING THE QUESTIONNAIRE:  
NAME & POSITION OF PERSON COMPLETING THE QUESTIONNAIRE:  
DATE OF COMPLETION:**

#### 12.8. Casestudies and scenarios

This chapter describes the objectives of the case studies criteria for selection as well as the methodology for analysis. Case studies selection has been completed in the second stage of the project.

It also presents the provisional thinking at this stage for the scenarios.

The case studies analysis and the scenarios will be carried out during the third stage of the project.

#### **Case studies**

Objectives of the case studies

Case studies are an important part of the general analysis developed at European level.

First, case studies will **evaluate**, on the one hand, **the relevance of the database and of the analysis at local level (micro level)**, which is the level of actual implementation of policies and action programmes, and **collect extra information** unmonitored by the database on the other hand, helping filling gaps and possibly understanding unexpected outcomes.

Evaluating the relevance of the database at local level is of special importance, as far as spatial indicators might have to be reviewed in the objective of building an accurate European monitoring system for natural heritage.

Evaluating the relevance of the analysis of the interrelations between the management of the natural heritage and spatial development is also necessary because it is assumed that there are significant differences between phenomenon at local level and analysis at NUTS3 level, which is the level of the database analysis. Case studies will highlight the limits and level of reliability of the analysis, in order to give scientific rigor to the general framework of the study.

On the other hand, the database cannot provide all the relevant information about management and about interrelations, especially for qualitative development and management trends, as well as for the effectiveness of the management at local level. Case studies will feed the project with ground-based information.

Second, case studies will **provide matter to develop long term evolution scenarios**. Case studies will give precise basis and territorial context to develop them (see below).

To sum up, the objectives of the case studies are:

- To check the relevance of the database indicators
- To feed back the main analyse, help to choose the most relevant indicators
- To provide extra information from the local level about management
- To provide an understanding of the effectiveness of the management from local level
- To provide information for the development of the scenarios

### *Selection of cases studies*

Case studies have to be selected in a way that reflects the diversity of European natural heritage, of management and of development contexts.

The criteria chosen are the following:

- The total panel of case studies present a territorial diversity, in relation to geography (from coastal areas to mountains) and to the urban/rural system
- The area is concerned by a European directive  
The policy assessment has at least to bear on European policies
- The management has been effective over a sufficient period, allowing for evaluation

Highlighting development trends implies to study changes over long periods

- The contributor as an easy and total access to the data  
It is a question of efficiency of the study program
- The management has a character of exemplarity for regions elsewhere in Europe  
It will enable to report on best practice
- The area is under pressure or depressed  
Unstable territorial contexts enable to highlight easily development trends

**----to be completed with the contributors proposals----**

### *Analysis of the case studies*

#### *Method*

Case studies are carried out by members of the team, all coming from different EU countries, giving an extra opportunity to enrich the analysis and their conclusions with the cultural diversity to enhance within the EU.

Yet, all case studies will be carried out within a 'common' framework thanks to an harmonized checklist that has been designed to fit with different types of management, different territorial contexts, and different scales.

The checklist consists of 43 questions clustered in thematic blocks encompassing all the issues aforementioned:

- Description of the territorial context,
- State of the natural heritage,
- Description of the management,
- Assessment of the spatial interrelations,
- Assessment of the effectiveness of the management,
- Assessment of the effectiveness of ESDP objectives.

**>> Has the questionnaire (provisional version) be annexed?**

At this stage, it is assumed that the analysis will mainly focus on:

- The relevance of the EU level database
- The difficulties encountered in implementing management
- The effectiveness of the management
- The best practices
- The compliance with the ESDP objectives
- The expected evolutions for next 10/20 years (qualitative approach)

## Scenarios

### Objectives and methodology

Since central question is about the influence of the management of natural heritage, it is relevant to compare the impacts of two possible territorial evolutions:

- **the evolution under current trends.**
- **the evolution under an effective protection and valorisation of the NH,**

The scenarios are not made to predict future, but to anticipate and help prepare public policies. What would happen if...?

At first it had been envisaged to develop two scenarios at European level. Considering the geographic area at study – 27 countries, was discussed the relevancy and the use for the project in its whole. Finally, it was decided to develop the scenarios on the basis of the case studies and to draw general conclusions about the possible evolutions of natural heritage according to territorial typologies. Extrapolations will be made, as far as possible, at European level.

The scenario building process will rest on an integrated approach, addressing simultaneously natural heritage issues and spatial development ambitions, related to demography and economy.

A simple method to build realistic scenarios is the following:

- 1 – Identify the main factors influencing the evolution of the studied system are identified. These factors are called **driving forces**, evolving and interacting to produce changes over time.
- 2 – Analyse the possible evolutions of each driving forces are studied together with their effects on the studied system. This provide **sub-scenarios**.
- 3 – Elaborate different combinations of sub-scenarios. They provide **global scenarios**. They are possible futures.

As said above, our project will focus on two particular scenarios.

The first scenario ,scenario under **current trends of the driving forces** aims at presenting the future state if nothing is done to tackle the negative development trends.

The main objective of such a scenario is to evaluate as much as possible the risks for natural heritage if today's "consumption" continues taking into account the management actions that are implemented. It should highlight the effective impacts and responses of the implemented policies.

Since current trends might evolve according to society changes, it is more relevant to know about **expected future trends**. This is an expertise issue.

The question will be: is there a consensus about the most probable evolution of the considered development trend for the considered area? The scenarios will based on case studies, on the outcome of the database analysis, and on the conclusions of other ESPON projects (project 1.1.1 Polycentric, project 1.1.2 Urban-rural for instance). A consensus will be hardly obtained beyond 10 years, so it will be difficult to build the first scenarios beyond that time. By default of consensus, current trends will be extrapolated.



The second scenario would seek to answer the question of **what would be the impact of a true and effective protection and valorisation of natural heritage**. The second scenario will be based on **goal-oriented sub-scenarios**. It would happen if the driving forces are tackled in a desirable way, referring to sustainable developments models (namely the ecological network model and the compact and polycentric cities model). Here long term objectives can be elaborated and defining long term scenarios is conceivable. It will present the consequences on policies related to the control of urban and infrastructure developments and land use shifts.

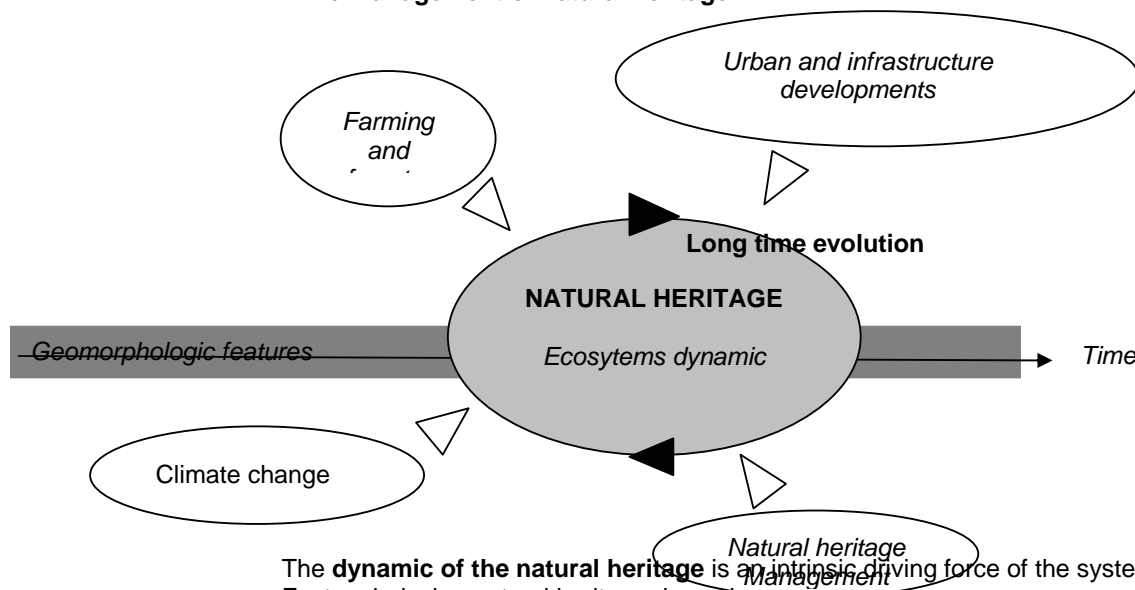
Natural heritage system

### Natural heritage driving forces

Natural heritage can be seen as a changing system of interacting driving forces. Their evolutions will determinate the evolution of the natural heritage over time.

Four main driving forces can be distinguished:

- **The intrinsic dynamic of the natural heritage,**
- **Farming and forestry,**
- **Urban and infrastructure developments,**
- **The management of natural heritage.**



The **dynamic of the natural heritage** is an intrinsic driving force of the system. Factors inducing natural heritage dynamic are:

- *Geomorphologic features* (steeps, soils and the hydrologic system), from large features (e.g. mountain, river basins, etc) to small features (e.g. drills, local soils variations, etc). They do not evolve at the time scale we consider (10 to 50 years): they will be considered as permanent factors. Nonetheless they are important for building scenario 2, in so far as they give strong basis for the description of the natural heritage current state, for the definition of potential areas for biodiversity and, as a consequence, for the designing of the ecological network.

- *Climate*. As well as geomorphologic features, climate is hardly manageable. But it cannot be considered as permanent: its evolutions might be decisive, especially in Mediterranean countries and in coastal areas.
- *Ecosystems internal dynamic*: without equilibrium factors like fire, grazing or flood removals, internal dynamic drives ecosystems toward forests. It will be considered as a relevant driving force in case of farming decline for instance.

**Farming and forestry** and their associated productive landscapes are the second cluster of driving forces.

Considering them as external to the natural heritage (id est. excluding arable lands), they shape landscapes. Outside urban areas, their pattern roughly determine the pattern of natural heritage, which is mainly confined to the lands which are not profitable for modern agriculture in our countries (sloping, rocky, and wet lands). So, the pattern of natural heritage varies with the variation of their pattern, according to socio-economic changes. They also have side effects like diffuse pollution or erosion.

Considering them as internal to the natural heritage, they are also important as far as they enable to maintain agro-dependant ecosystems and forest ecosystems. In fact, our natural heritage mainly relies upon traditional farming practices (wet meadows, moor-lands, mountain meadows) or traditional forestry (valuable forest ecosystems). Agriculture is an essential component of many nature reserves, where ecological maintenance is often economically and practically difficult without farming.

**Urban and infrastructural developments** form another group of driving forces.

They also shape landscapes and thus the natural heritage structure.

Land fragmentation by infrastructures is recognized as negative for the ecological processes at landscape scale.

Their main negative effect is soil consumption and soil sealing. Soil consumption is negative in term of potentiality for food production, especially in the expected context of a continuing global population growth parallel to an important soil loss in southern countries due to erosion and an increasing soil salinity. As for soil sealing, it increases water run off.

They have also negative side effects, like pollution, over-use of natural spaces or night lighting, associated with severe perturbations of nocturnal ecological processes.

At last, the **management of the natural heritage** influences natural evolution throughout planning regulations, site management and ecological farming incentives.

Its evolutions will drive natural heritage evolutions according to its level of integration in spatial development plans, to its level of requirements, and of implementation. Ultimately it depends on society awareness for environmental matters. Ideally, it encompasses all the driving forces, being included in a sustainable spatial development strategy.

### **Territories and driving forces**

The driving forces are not distributed homogeneously over Europe, both in term of presence/absence and in term of intensity.

The respective weights of driving forces will depend on the considered territory.

Territorial typologies may be distinguished according to the driving forces.

<b>Driving forces</b>	<b>Territorial typologies</b>
<b>Ecosystems dynamic</b>	Areas prone to erosion and desertification
	Coastal areas prone to the elevation of sea level
<b>Farming and forestry</b>	Extensive farming areas (mountains meadows, moor lands, some coastal areas...)
	Mixed areas
	Intensively managed areas (e.g. Thames basin)
	Forested areas
	Areas with small, private and dispersed forestry
<b>Urban and infrastructure developments</b>	Growth areas (metropolitan areas, coastal areas under fast developments)
	Intermediate areas with slow growth dynamic
	Areas with negative growth dynamic
<b>Management</b>	Protected areas
	Areas under general environmental protection
	Areas under integrated spatial planning

Territory can be defined throughout combinations of typologies. That exercise will be carried further on thanks to the case studies and the results of the other ESPON Projects.

### **Evolutions of the driving forces**

According to the territorial context, each driving force presents a different initial trend.

At this stage, different sub scenarios can be anticipated.

<b>Driving forces</b>	<b>Sub-scenarios</b>
<b>Ecosystem dynamic</b>	Elevation of sea level, seashore erosion,
	Long term ecosystems changes according to climate change
	Desertification (Southern Europe)
<b>Farming and forest</b>	Intensification and modernisation of farming systems (east Europe)
	Extensification (shift from intensive to less intensive farming systems)
	Stability
	Farming decline: forestation or residential developments
<b>Urban and infrastructure</b>	Urban sprawl and landscape fragmentation by infrastructures
	Slight urban sprawl
	Re-use and urban regeneration
<b>Management</b>	No management or inefficient management
	Management of the protected areas
	Open spaces strategies with ecological network strategies

	(agro-ecological strategies and landscape ecological enhancement)
	<i>Open spaces strategies with ecological network strategies, including urban developments controls</i>

Case studies will provide the main inputs to the definition of the initial state and expected trends of the driving forces.

Scenarios 1 will be based on the observed driving forces.

*Sustainable scenarios – provisional thinking*

In those scenarios, the driving forces are tackled in a sustainable way, referring to sustainable spatial development approaches: the ecological network model and the compact cities model.

Those two models are promoted by various experts and institutions, respectively on the one hand by the Council of Europe (*Pan European Strategy for Biological and Landscapes Diversity, 1997*), the International Union for Nature Conservation, and, on the other hand, by the European Commission (Europe 2000+, ref?) and the Organisation for Economic and Development Cooperation (OCDE, 1990, 1995) They are mainly designed for pressured territories (urban and farming), and may not be always relevant for depressed territories. We present here the provisional thinking for the way in which second scenarios will be developed.

**Ecological network strategy**

The **ecological network** will be implemented. There is a consensus today to argue that it is the best way to tackle conservation issues throughout spatial planning. Its operational translation consists of *agro-ecological strategies* and of *landscapes ecological enhancements*. It seeks at different scales biodiversity conservation, landscapes ecological enhancement, pollution avoidance, hydrological regulations and soils conservation.

In general terms, different conservation issues are related with the different types of natural heritage features:

Natural heritage typology	Conservation issue
Natural and semi-natural areas of high value	High biological value (european and national level, proxy : Natura 2000)
Semi-natural areas of local interest	Biological value (local level, proxy : other designated areas)
Water streams and wetlands	Hydrological regulation and water hazard prevention, water quality enhancement
Water catchments	Value for drinking water
Arable lands	Productive value and run off control
Others natural open spaces	Permeable lands and ordinary ecological value

Roughly, each of these features has its own evolution requirements within a sustainable development strategy, referring to the ecological network model:

Longterm objective for the Ecological network strategy	Long term conservation	Corridors design	Buffer design
<b>Natural heritage typologies</b>			
<b>Natural and semi-natural areas of high value</b>	Compulsive	Important	important
<b>Semi-natural areas of local interest</b>	Important	Important	Important
<b>Waterstreams and wetlands</b>	Compulsive	-	Important
<b>Water catchements</b>	Compulsive + shift in land use towards forest or non-poluting farming	-	Important
<b>Arable lands</b>	Important	-	Important (field margins, water stream edges)
<b>Other open spaces</b>	Not compulsive	-	-

*Long term conservation: status quo of the current state, site management if needed.*  
*Buffer: shift towards a less intensive land use (large scale) and creation of linear natural features (micro scale) along or around natural heritage features.*  
*Corridors: shift towards a less intensive land use (large scale) and design of new natural features (micro scale) between existing natural heritage features.*

As regard to the possible evolution of each category, that grid may help to give an idea of the long term desirable state of a given area, within which one can distinguish spaces:

- that must be maintained in a long term basis
- that should be maintained in a long term basis
- that should be mutated for natural heritage's management purposes, by designing corridors and buffers and implementing agro-ecological strategies
- that could be mutated for other purposes.

That rationale mainly focuses on 'open spaces issues', including natural heritage enhancement issues, soil conservation issues and farming pollution avoidance. That is an important point to associate the farming sector for its promotion.

That rationale is sectorial. Thence, to build a sustainable rationale for spatial planning, it has to be mitigated considering what is sustainable in term of urban developments.

### Urban and transport existing structures

In that perspective we will refer to a simple **polycentric and linear model of compact cities**, guided by the idea that new developments should rest on existing structures (cities, infrastructures). It is promoted by various institutions, including the European Commission (EC, Green Paper on the Urban Environment, 1990).

Three main hypotheses will guide our rationale:

- Urban sprawl and especially infrastructure developments around urban areas almost stop, as far as those forms of urban developments are known to be highly unsustainable ; infrastructure developments are only reasonable for less accessible territories at regional scale,
- (in case of population growth), housing needs are mainly mitigated by urban regeneration,
- together with the development of green structures in and around cities, housing and economic activities extensions are planned with a high level of functional and aesthetic design, integrated with the transport system along the main transport infrastructures, (functional diversity and support for public transport systems).

These are the basic requirements for the achievement of sustainable cities in a spatial point of view. They are not self-sufficient and have to be included in overall sustainable development policies framework, targeting amongst others lifestyles, new residential forms, enhancement of public transport systems and consumption.

### Outputs

Actually it might not be possible to give a representation of that scenario at large scale, as far as:

- Those two models mainly rest on existing structures and do not transform territories.
- Land-use changes favourable to the ecological network model mostly happen at micro scale (field margins, river margins, forestation of water catchments...). At the contrary, developing large corridors to connect natural areas will probably be impossible for the territories where the other land uses are dynamic.

Combining those two models would provide sustainable developments scenarios.

Thus, it is assumed that our work on sustainable scenarios will present:

- General requirements for tackling urban developments and agricultural issues in the perspective of sustainable natural heritage policies,
- Cartographic representations, as far as possible, depending on the scale of the case studies. Locations of the preferable urban growth might be indicated. The hydrological system might help to give a representation for the location of most changes favourable to the ecological network model. But it is in its terminations, at micro scale that it is the most important to promote them.
- According to the local context, considerations on how to promote the desirable status quo or landscape changes, in a long term and participative perspective, reporting on cases of good local practice.

### Evaluation

Scenario 2 will be evaluated through a SWOT analysis in order to assess its feasibility.

Case studies will feed it back.

<b>STRENGTHS</b>
- Landscape evolutions following the ecological network model would maintain and

enhance the ecological value of the territories, as well as limit pollutants transfers. Such evolutions can be implemented on a long term perspective, combining planning and participatory mechanism.

- The urban aspects of the scenario would lead to a more compact and continuous urban fabric, favourable to more sustainable mechanized communities. The resulting urban settlement patterns are supposed to minimise impacts on natural heritage and on open spaces
- Territories would broadly be kept unchanged in a long term perspective.

#### **WEAKNESS**

- Scientific uncertainty concerning the ecological network model, and concerning the polycentric and compact cities model, although they are promoted at international level.
- There will be gaps between spatial planning strategies and effective developments if the links with local planning are not done.
- Implementing the ecological network requires to involve the farming sector, facing today economic difficulties and thus less willing to implement it.
- Creating nature features will diminish surfaces available for production, what requires to mitigate economic effects for farmers.
- Numerous farming-dependant ecosystems or sensitive areas will only be maintained thanks to public credits. It is an economic issue in a long term perspective.
- Political misunderstanding of the strategy, especially at local level, or political difficulties in translating it into planning guidance. It could at the extreme lead to 'non-development guidelines' for infrastructures. It could also be seen as a non-liberal scenario.
- Reducing areas available for building, which may lead to an increase in the land prices (but it is already the case in most urban areas) and to conflicts with the building sector
- That spatial strategy cannot tackle a-spatial sustainability issues, though of importance in a long term perspective for natural heritage (mechanized society, mass consumption, energy wasting, pollution...).



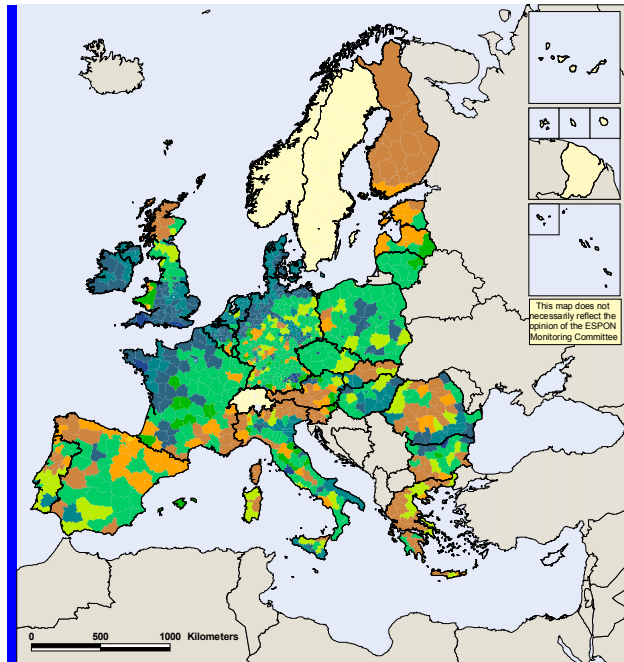
<b>OPPORTUNITIES</b>
<ul style="list-style-type: none"> <li>- Increasing awareness of the value of the natural heritage</li> <li>- Numerous initiatives are compatible with the ecological network, referring or not to the theoretical model (river restoration, field edges policies, integration of water management in urban developments, integrated spatial planning)...</li> </ul>
<b>THREATS</b>
<ul style="list-style-type: none"> <li>- An increased focus on natural asset might lead to the urbanisation of the most valuable natural areas (mountains, coastal areas, and in the surroundings of growth centres), together with a social segregation due to an increase of land prices ('ecological segregation').</li> <li>- Sudden decrease of allocations for ecological management might arise with the enlargement</li> <li>- Farming decline may lead to a decrease of the biodiversity of some areas</li> </ul>

References:

- OEDC, *Environmental Policies for Cities in the 1990'*, OCDE, Paris, 1990  
 ECTM/OEDC, *Urban travel and Sustainable Development*, Paris, 1995  
 COMMISSION OF THE EUROPEAN COMMUNITIES, *Green Paper on the Urban Environment*, CEC, Luxembourg, 1990  
 COMMISSION OF THE EUROPEAN COMMUNITIES, *Towards sustainability ; a European Community Program of Policy and Action in Relation to the Environment and to the Sustainable Development*, CCE, Bruxelles, 1992

*(We should have more recent references)*

## Fragmentation of natural areas for NUTS3 regions



Fragmentation for NUTS3 regions

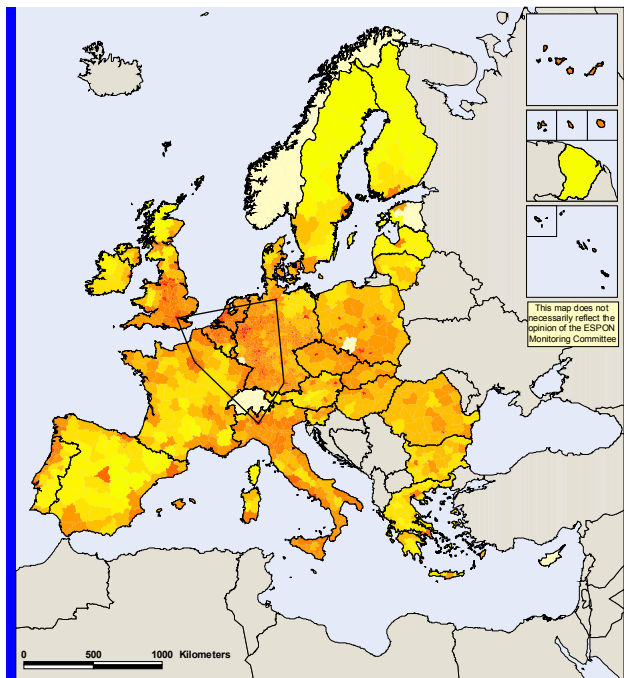
- > 50 % natural area and < 10 patches / 10km<sup>2</sup>
- > 50 % natural area and 10 - 30 patches / 10km<sup>2</sup>
- > 50 % natural area and >30 10 patches / 10km<sup>2</sup>
- 20 - 50 % natural area and < 10 patches / 10km<sup>2</sup>
- 20 - 50 % natural area and 10 - 30 patches / 10km<sup>2</sup>
- 20 - 50 % natural area and >30 10 patches / 10km<sup>2</sup>
- < 20 % natural area and < 10 patches / 10km<sup>2</sup>
- < 20 % natural area and 10 - 30 patches / 10km<sup>2</sup>
- < 20 % natural area and >30 10 patches / 10km<sup>2</sup>

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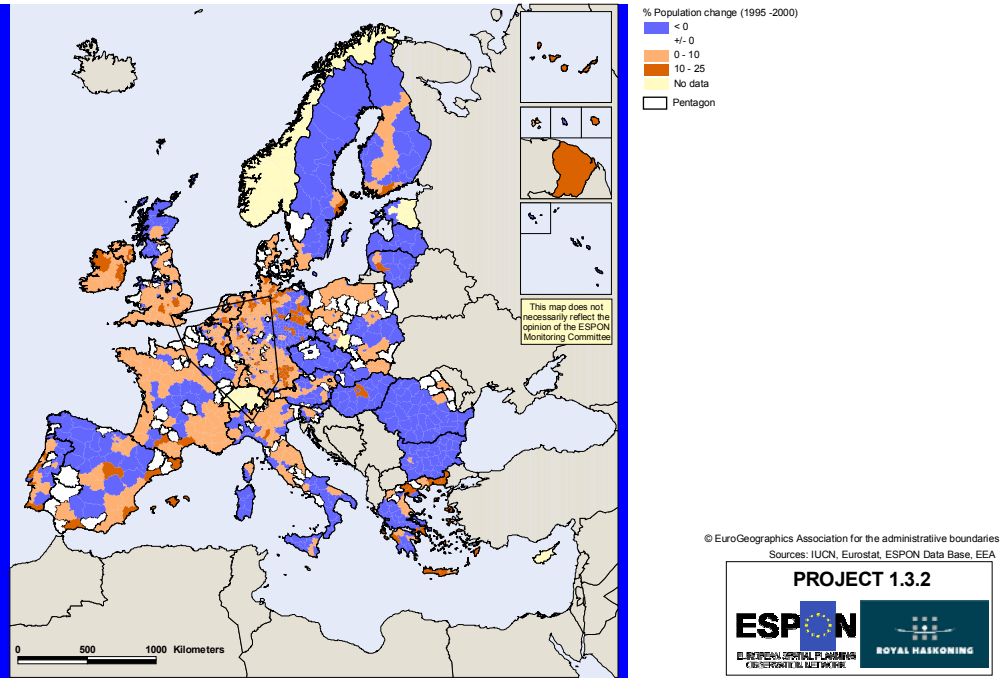
## 2.2 Population density for NUTS3 regions



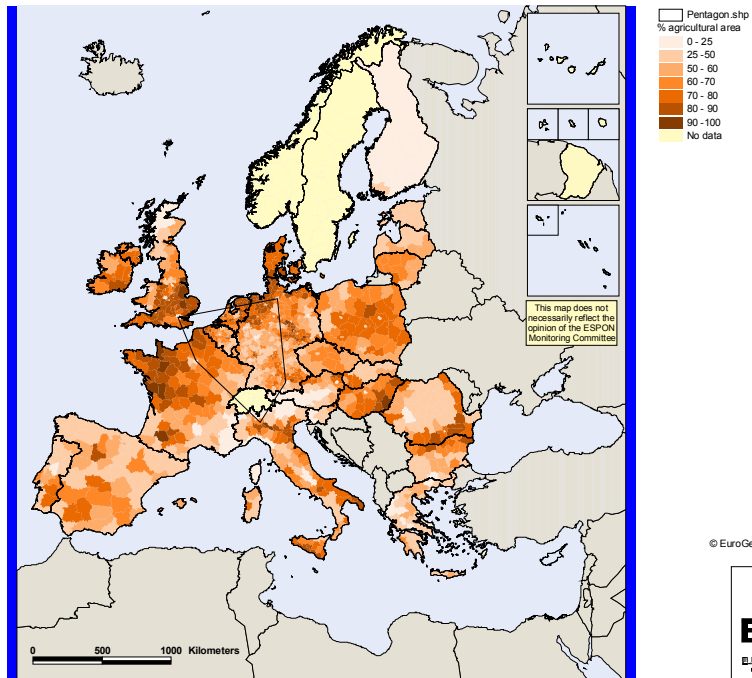
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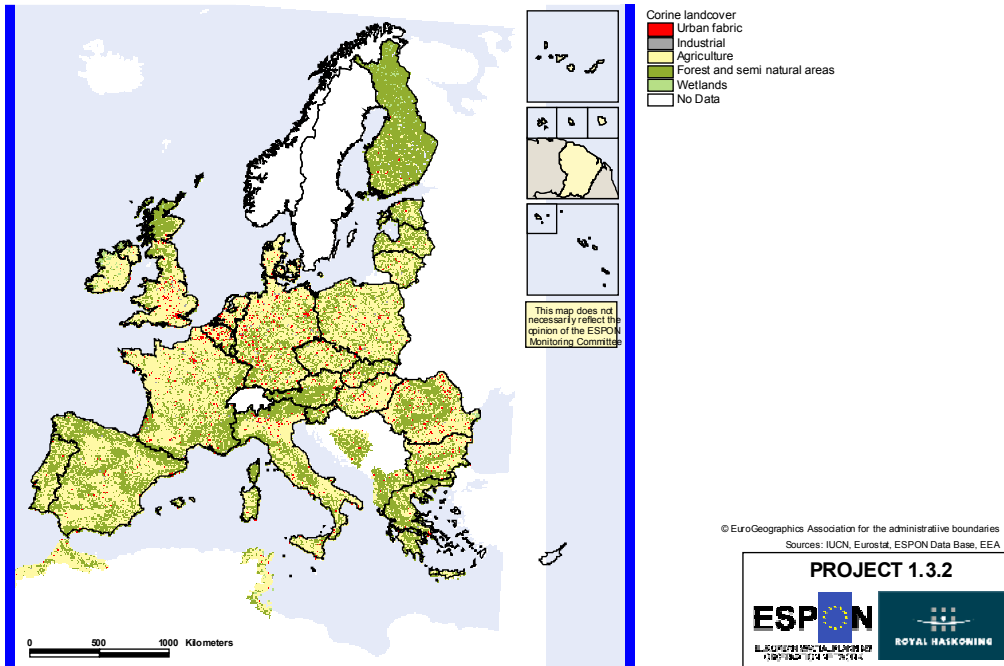
### 2.3 Population growth for NUTS3 regions



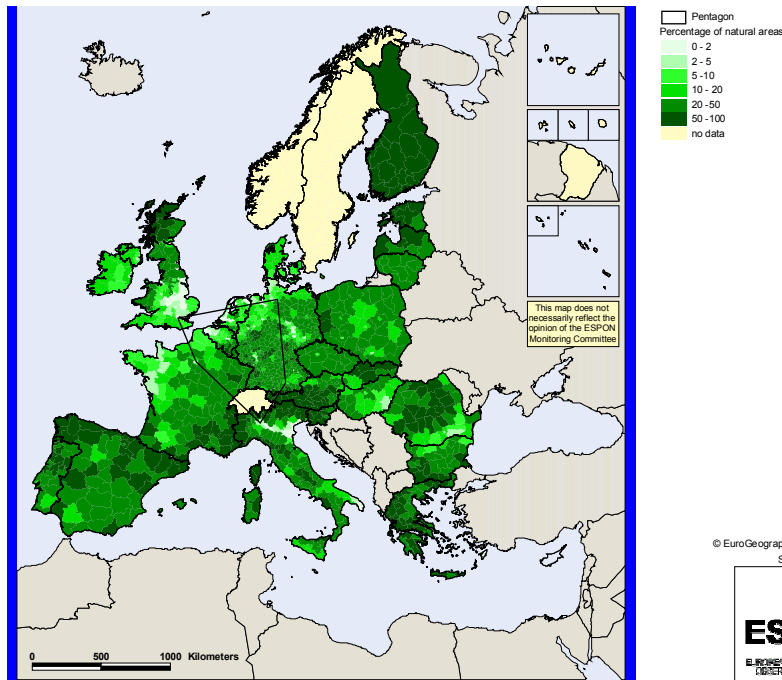
## 2.4 Percentage of agricultural area for NUTS3 regions



## 2.5 Distribution of semi-natural landcover types



## 2.6 Percentage of natural area for NUTS3 regions

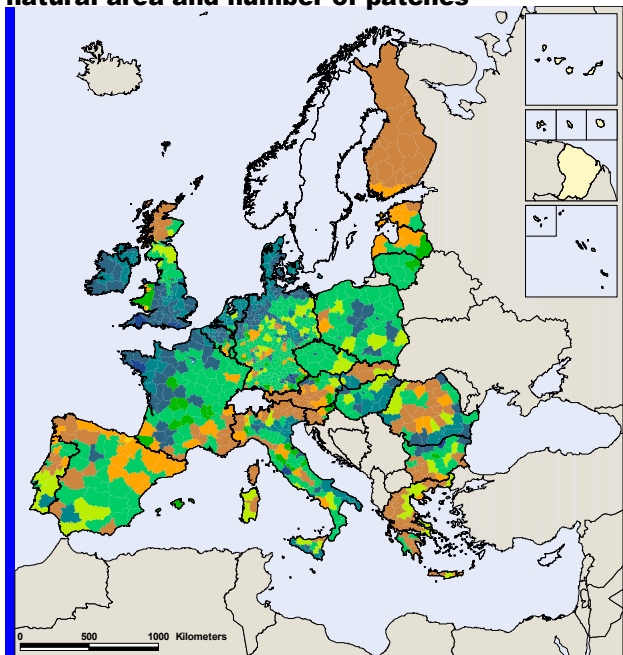


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## 2.7 Fragmentation index consisting of % natural area and number of patches



- Fragmentation index
- > 50 % natural area and < 10 patches / 10km<sup>2</sup>
  - > 50 % natural area and 10 - 30 patches / 10km<sup>2</sup>
  - > 50 % natural area and >30 patches / 10km<sup>2</sup>
  - 20 - 50 % natural area and < 10 patches / 10km<sup>2</sup>
  - 20 - 50 % natural area and 10 - 30 patches / 10km<sup>2</sup>
  - 20 - 50 % natural area and >30 patches / 10km<sup>2</sup>
  - < 20 % natural area and < 10 patches / 10km<sup>2</sup>
  - < 20 % natural area and 10 - 30 patches / 10km<sup>2</sup>
  - < 20 % natural area and >30 patches / 10km<sup>2</sup>

**PROJECT 1.3.2**

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#### 4.1 Distribution of designated wetlands (Ramsar)



Ramsar.shp

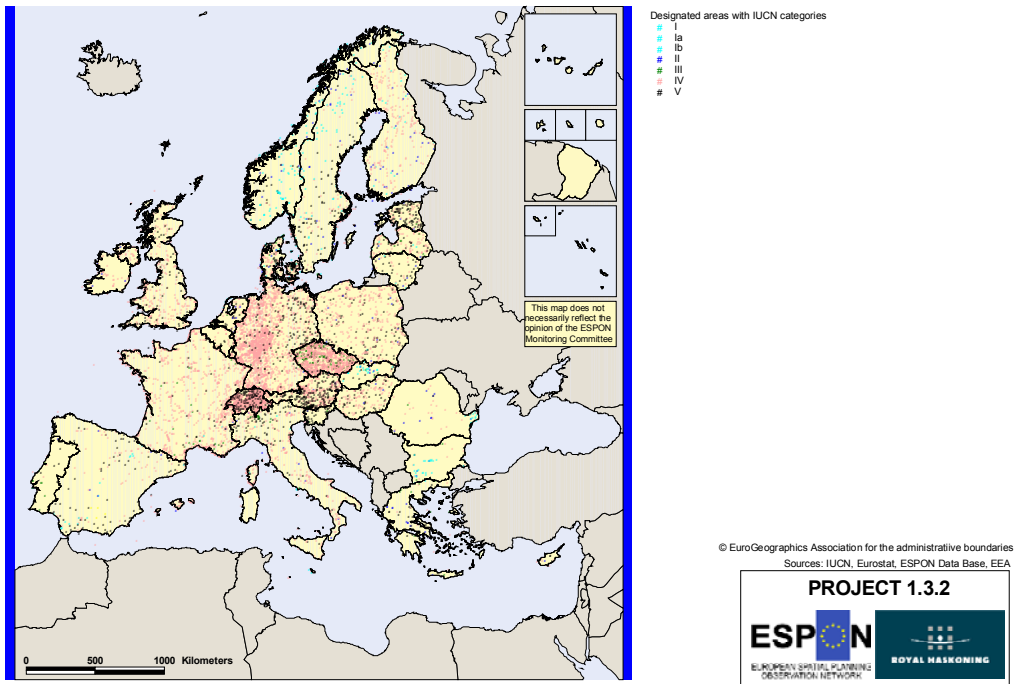
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**PROJECT 1.3.2**

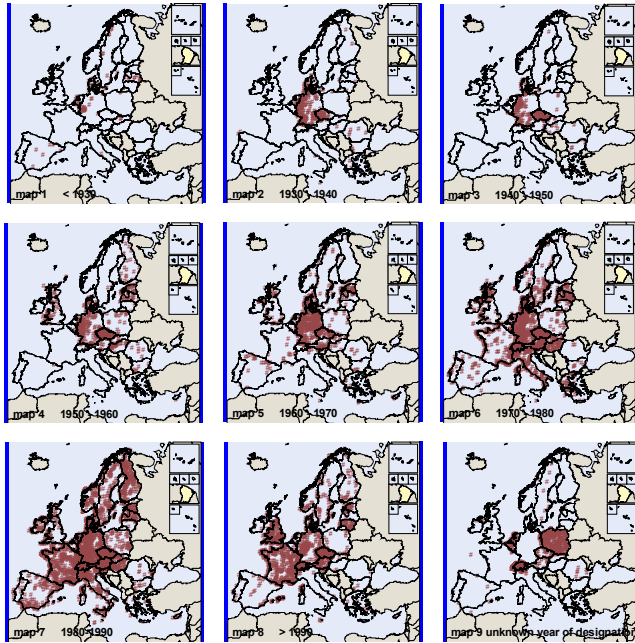
**ESPON**  
EUROPEAN SPATIAL PLANNING  
OBSERVATION NETWORK

**ROYAL HASKONING**

## 4.2 Distribution of designated natural areas (IUCN)



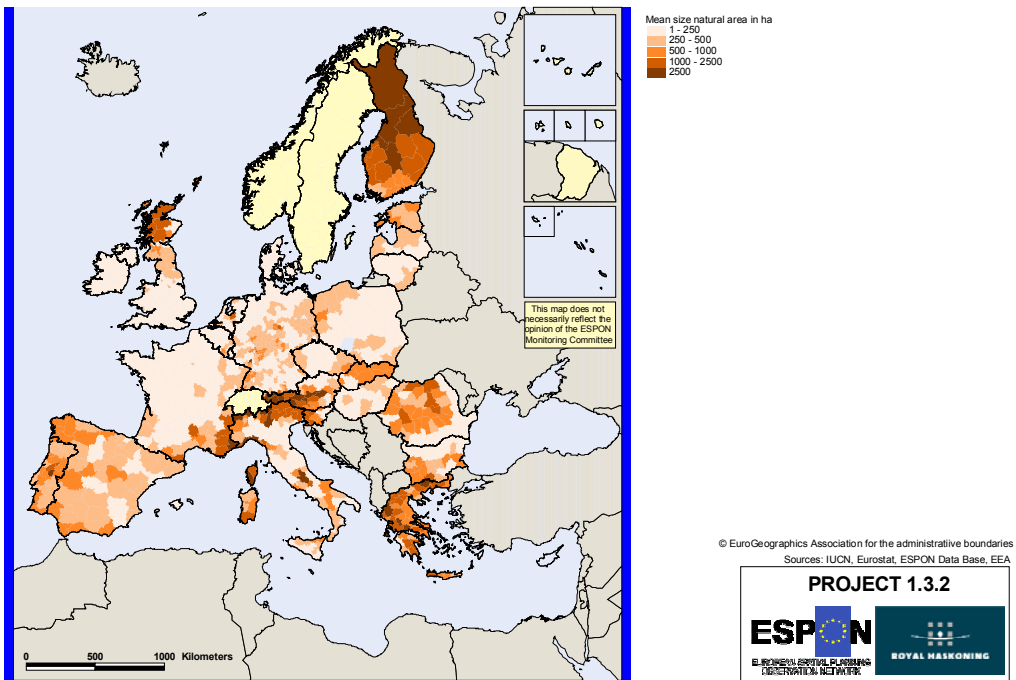
### 4.3 Distribution of designated natural areas for different periods of time (IUCN)



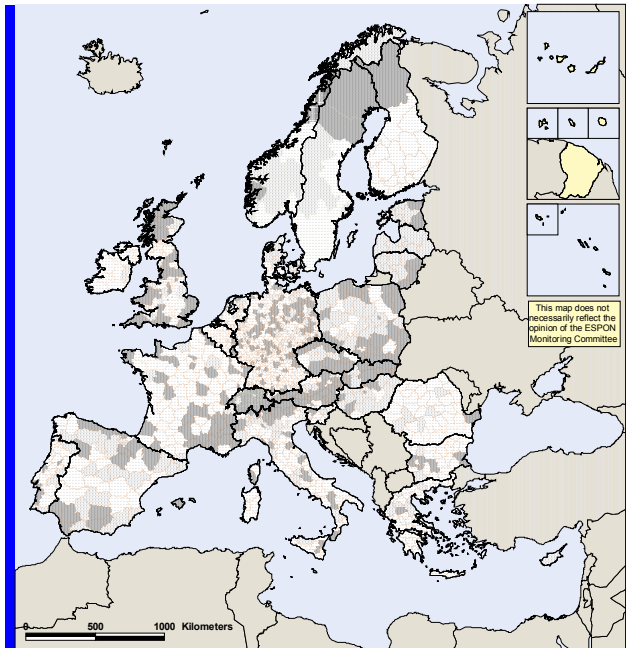
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Sources: IUCN, Eurostat, ESPON Data Base, EEA



#### 4.4 Mean size of natural areas for NUTS3 regions



## 5.2 Percentage natural area and percentage of designated natural area for NUTS3 regions



Percentage area designated for NUTS3 regions

0
2 - 10
> 10
% natural areas NUTS3 regions
0 - 2
2 - 5
5 - 10
10 - 20
20 - 50
50 - 100
no data

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