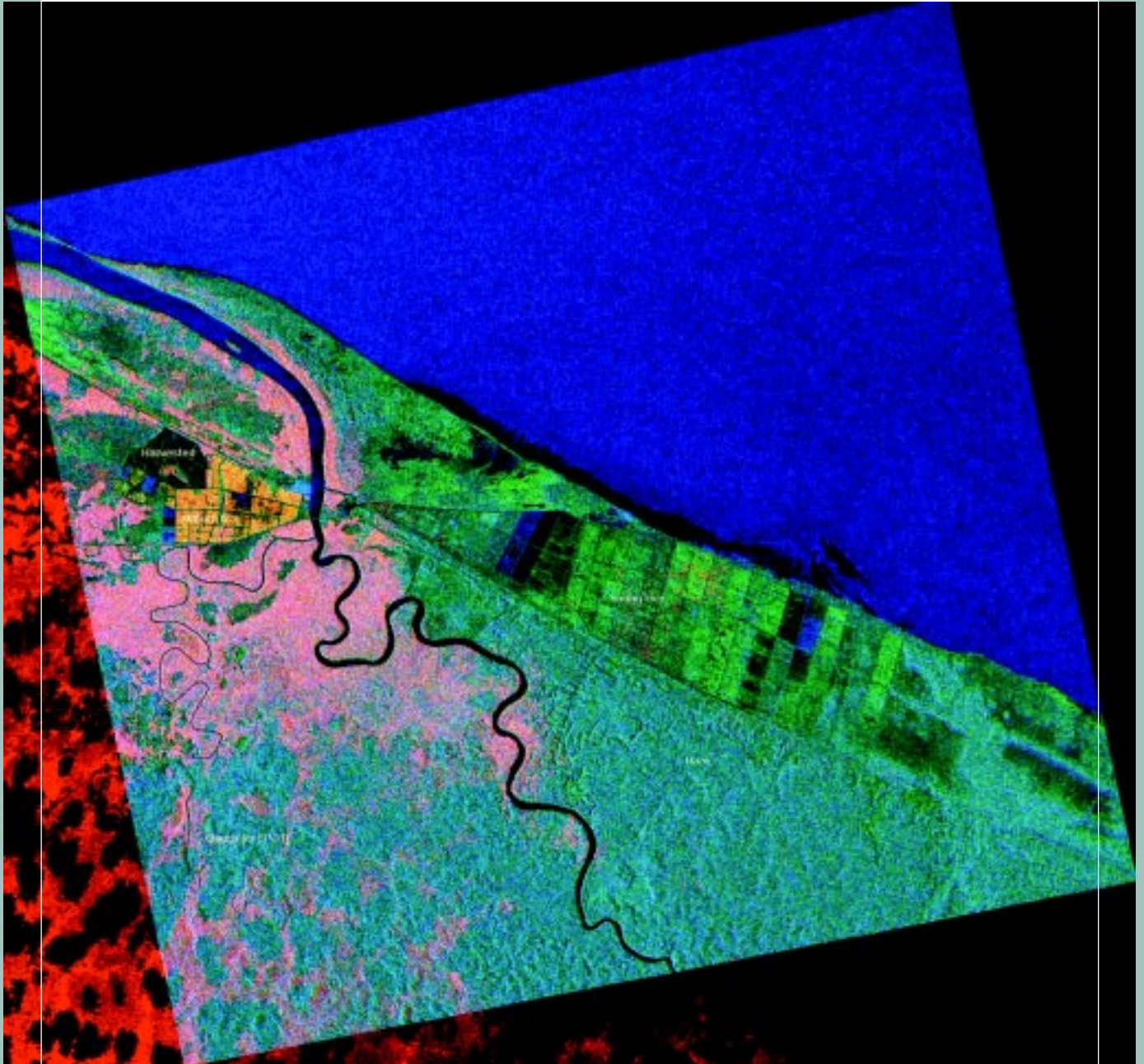


# Learning from European Transfrontier Landscapes

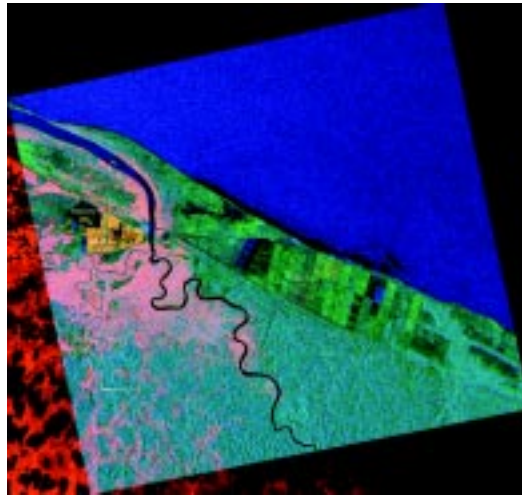


Edited by  
Dirk M. Wascher and Marta Pérez-Soba



Project in  
Support of  
the European  
Landscape  
Convention

# Learning from European Transfrontier Landscapes



Landscape Europe  
with the collaboration of:

Alterra, Wageningen UR, The Netherlands  
Aristotle University of Thessaloniki, Greece  
Belarusian State University, Belarus  
Bezirksregierung of Lower Saxony (Weser-Ems), Germany  
Council of Europe, Strasbourg, France  
Czech Agricultural University, Czech Republic  
Geological Survey of Ireland, Ireland  
Institut National de la Recherche Agronomique, France  
Instituut voor Natuurbehoud, Belgium  
Landscape Alliance Ireland, Ireland  
Ministry of Agriculture, Nature and Food Quality, The Netherlands  
Provincie Gelderland, The Netherlands  
The Netherlands Institute for Spatial Research, The Netherlands  
Universidad Autónoma de Madrid, Spain  
Universidade de Évora, Portugal  
Università degli Studi Milano-Bicocca, Italy  
University of Vienna, Austria  
University of Western Hungary, Hungary



Copyright 2004 Landscape Europe

ISSN 1566-7197

Alterra report number 964/May 2004

This publication should be cited as follows:

Wascher, D.M. and Pérez-Soba, M. (eds.) 2004. Learning from Transfrontier Landscapes – Project in Support of the European Landscape Convention. Alterra Wageningen UR, Wageningen, The Netherlands. Alterra report 964. vi + 58 pp.

Published by Landscape Europe in collaboration with Alterra Wageningen UR

Available from Landscape Europe Secretariat,  
Marion Bogers,  
Alterra Wageningen UR,  
P.O. Box 47,  
NL-6700 AA Wageningen (The Netherlands)  
Phone: +31 317 474610  
Fax: +31 317 419000  
E-mail: marion.bogers@wur.nl

Cover photograph: Landscape Europe

© 2004 Landscape Europe

Designed by **Nature**Bureau International  
36 Kingfisher Court, Hambridge Road, Newbury  
Berkshire RG14 5SJ, United Kingdom

Printed by Information Press Ltd, Oxford, United Kingdom

No part of this publication may be reproduced or published in any form or by any means, or stored in a database or retrieval system, without the written permission of Landscape Europe.

Alterra assumes no liability for any losses resulting from the use of the research results or recommendations in this report.

# Contents

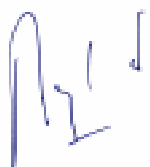
|  |    |
|--|----|
| Preface .....  | iv |
| Acknowledgements .....   | v  |
| Summary .....  | vi |
| 1. European Transfrontier Landscapes: Changes, Chances and Challenges .....          | 1  |
| 1.1 Introduction .....   | 1  |
| 1.2 Landscape Definition and Perception .....  | 2  |
| 1.3 European Transfrontier Landscapes Initiatives Arising from the Recent Past ..... | 2  |
| 1.4 European Policy and Funding Initiatives .....                                    | 3  |
| 2. Landscape Character Assessment Tools .....  | 5  |
| 2.1 Introduction .....   | 5  |
| 2.2 Landscape Character and Quality .....  | 5  |
| 2.3 European Landscapes Map and Typology .....                                       | 5  |
| 2.4 Landscape Indicator Development .....  | 7  |
| 3. Objectives and Approach for Transfrontier Landscape Assessment .....              | 9  |
| 3.1 Project Objectives .....   | 9  |
| 3.2 Methodological Approach .....  | 9  |
| 4. The Case Studies .....  | 11 |
| 4.1 Mediterranean Landscapes .....   | 12 |
| I Montado/Dehesa (PT/ES) .....   | 15 |
| II Atlantic Mountains: The Arribes del Duero/Arribes do Douro (ES/PT) .....          | 18 |
| III The River Ticino (IT) .....  | 21 |
| IV Gran Paradiso/Vanoise National Park (IT/FR) .....                                 | 23 |
| V Lagkada County (EL) .....  | 25 |
| 4.2 Continental Landscapes .....   | 27 |
| VI Fertő/Neusiedler Lake (HU/AT) .....   | 29 |
| VII Šumava Mountains/Boehmerwald/Bayerischer Wald (CZ/AT/ZDE) .....                  | 31 |
| VIII Bielaviezhszkaya Pushcha/Puszca Białowiecka (BY/PL) .....                       | 34 |
| 4.3 Atlantic Landscapes .....  | 37 |
| IX Hund-Paapsand/Hond-Paap (DE/NL) .....   | 40 |
| X Twente/Achterhoek/Bentheim/Borken (DE/NL) .....                                    | 42 |
| XI Gelderse Poort (NL/DE) .....  | 44 |
| XII The Border Meuse (BE/NL) .....   | 46 |
| XIII Brittany/Normandy (FR) .....  | 49 |
| XIV Breifne Mountains (IE/UK) .....  | 51 |
| 5. Review of the Case Studies .....  | 53 |
| 6. Conclusions .....   | 55 |
| References .....   | 56 |

## Preface

Many European countries have a long-standing tradition in developing and implementing landscape-oriented conservation and planning schemes at the national and regional level. For centuries the outstanding cultural, aesthetic and ecological values of landscapes have been addressed by painters, writers and geographers alike, contributing to what is still perceived as 'cultural heritage', 'collective memory' or 'national identity' in many European regions. In terms of public attention and legislative action, landscapes have taken an early lead compared to nature conservation and biodiversity schemes. Environmental reports such as the Dobris Assessment (Stanners and Bourdeau 1995) have demonstrated that landscape protection is covering far more hectares of land throughout European countries than nature reserves or other categories. And in many countries, national parks – often associated with endangered species and special habitats – have actually been designated because of outstanding landscape scenery and cultural heritage.

Although *landscape* is one of the few policy themes that bridge the gap between social, economic and environmental issues by means of holistic and integrative concepts, research and policy experts at the European level still consider it essentially to be merely a geo-science-oriented approach. Despite the fact that many thresholds keep hindering interdisciplinary approaches and that Cartesian philosophies keep persisting in both policy and research, landscape science receives increasing attention with regard to addressing horizontal objectives and offering integrative concepts. In recent years, the changing role of landscape can be recognised in numerous policy fields.

The most important policy initiative in this respect, namely the European Landscape Convention – the first international treaty to be *exclusively* concerned with the protection, management and enhancement of European landscape – entered into force on 1 March 2004.



Maguelonne Déjeant-Pons  
Head of the Spatial Planning and Landscape Division  
Council of Europe

Applying to the Parties' entire territory and covering natural, rural, urban and peri-urban areas, the European Landscape Convention addresses ordinary or degraded landscapes as well as those that can be considered outstanding. While a number of other policies require reliable and targeted information on the state and trends of European landscapes, it is especially the European Landscape Convention that requires Parties to carry out research and studies in order to identify landscapes and analyse their characteristics and the dynamics and pressures which affect them.

In order to explore practical approaches for management and conservation, but also to stimulate co-operation between national experts, the Dutch Ministry for Agriculture decided to provide a contribution in kind on the practical implementation of the convention's Article 9 on Transfrontier Landscapes. According to this article, the Parties are asked to encourage transfrontier co-operation on local and regional level and, wherever necessary, prepare and implement joint landscape programmes. This report is meant as a contribution to Theme 2/2002 of the preparatory work for the implementation of the European Landscape Convention: *Landscape identification, assessment and quality objectives, using cultural and natural resources*.

As the development and implementation of European landscape policies is still in a rather early phase, much will depend on how attentively and thoughtfully we treat the existing vast pool of national experiences and knowledge. It is thus our pleasure and duty to express our special appreciation towards the large number of national experts who have contributed to the compilation of case studies on European transfrontier landscapes and without whom this international report would not have been possible. May their findings and observations become useful references for the implementation of the European Landscape Convention.



Dr Jan Willem Sneep  
Policy Co-ordinator Team International  
Ministry of Agriculture Nature and Food Quality  
The Netherlands

## Acknowledgements

The editors would like to express their sincere appreciation for the professional, unconditional and entirely voluntary support from a large group of national and international experts for this project. We were aware of the fact that our requests for targeted input were in competition with many other professional obligations and therefore we consider the experts' commitment as enthusiastic. Though the project group clearly exceeds the boundaries of the expert network Landscape Europe, we are pleased to note that the network has demonstrated its capacity and cohesion qualities in an impressive manner.

We would like to thank the following experts:

Marco Baietto, Università degli Studi Milano-Bicocca, Italy

Geert de Blust, Instituut voor Natuurbehoud, Belgium  
Jacques Baudry, Institut National de la Recherche Agronomique, France

Cathy Buchanan, Landscape Alliance Ireland, Ireland  
Riet Dumond, Provincie Gelderland, The Netherlands  
Ingolf Faida, Bezirksregierung of Lower Saxony (Weser-Ems), Germany

Maria Falaleeva, Belarusian State University, Belarus  
Ioannis Ispikoudis, Aristotle University of Thessaloniki, Greece

Éva Konkolyné Gyuró, University of Western Hungary, Hungary

Rob Jongman, Alterra WUR, The Netherlands  
Galina I. Martsinkevitch, Belarusian State University, Belarus  
Rafael Mata Olmo, Universidad Autónoma de Madrid, Spain

John H. Morris, Geological Survey of Ireland, Ireland  
Zdenekm Lipsky, Czech Agricultural University, Czech Republic

Patrick O'Connor, Geological Survey of Ireland, Ireland  
Terry O'Regan, Landscape Alliance Ireland, Ireland  
Emilio Padoa-Schioppa, Università degli Studi Milano-Bicocca, Italy

Ana Paixão Ferreira, Universidade de Évora, Portugal  
Teresa Pinto Correia, Universidade de Évora, Portugal  
Concepción Sanz Herráiz, Universidad Autónoma de Madrid, Spain

Anton Shkarubo, Belarusian State University, Belarus  
Anna Sidiropoulou, Aristotle University of Thessaloniki, Greece

Marijn van der Wagt, The Netherlands Institute for Spatial Research, The Netherlands

Thomas Wrbka, University of Vienna, Austria

The project was possible due to the commitment of the Dutch Ministry of Agriculture, Nature and Food Quality, especially Jan Willem Sneep and Hans Odin Faasen, by providing funding support and guidance when launching this project.

We also express our appreciation for the Council of Europe, especially for the Head of the Environment-Conservation and Management Division Maguelonne Déjeant-Pons, as well as the representatives of the Congress of Local and Regional Authorities of Europe (CLRAE), for inviting Landscape Europe to provide this contribution in the light of the future implementation of the European Landscape Convention.

Finally, we would like to thank the Alterra WUR team: Marion Bogers for final preparation of the format, Gerda van den Bosch for building up the location map of the transfrontier landscape studies, Sander Múcher for preparation of the European Landscape Typology map and Wim Nieuwenhuzien for preparation of the Mediterranean, Continental and Atlantic landscape maps. Finally, Bram Mabelis for his relentless efforts to arrange a case study on the transfrontier landscape Poland–Slovakia (Zawoja–Námestovo).

Dirk Wascher and Marta Pérez-Soba



## Summary

A close look at a sample of Europe's transfrontier landscapes demonstrates that despite the great biogeographic and cultural differences that exist between European countries, i.e. Ireland and Greece or Portugal and Poland, there are many common features related to the peripheral character of these landscapes and their direct exposure to other administrative territories. This is why transfrontier landscapes put national and international policies to the test, and why they challenge planners and scientists to develop specific tools and concepts. On the basis of 14 case studies across Europe, this report seeks to highlight the Strengths, Weaknesses, Opportunities and Threats (SWOT) related to the specific landscape characteristics and land use trends in transfrontier landscapes.

For each identified transfrontier landscape, the experts were asked to undertake a SWOT analysis to highlight the landscape characteristics (internal factors) in relation to the landscape's competitive environment (external factors).

A further objective of this report is to illustrate a variety of typical examples for the overall character, management, planning and conservation of transfrontier landscapes in Europe. Taking account of earlier initiatives such as the 'Ecological Bricks for Our Common House Europe' from

1993 and the IUCN/WCPA Programme 'Parks for Life: Action for Protected Areas in Europe' (IUCN 1990; 1999), the project is designed to support the European Landscape Convention (Council of Europe) – specifically its Article 9 on Transfrontier Landscapes – and the joint EUs funding programmes INTERREG III A and PHARE-CBC.

The data gathering for this project followed a step-wise approach, drawing upon the expertise of Landscape Europe and other international project partners, starting with the identification of transfrontier landscapes on the basis of existing information deriving from reports, field studies, inventories, descriptions and other sources. The identified transfrontier landscapes were supposed to be limited in size in order to facilitate data collection and reporting. Next, suitable regional and local experts and concrete information sources needed to be identified for providing targeted information for the project as well as for future assessments. The 14 identified case studies are distributed over pan-Europe, with good representations for the Mediterranean, Atlantic and Central-Continental regions. The transfrontier landscapes are discussed in the context of a European Landscape Typology and Map that has been developed, allowing comparisons of key attributes such as topography, geomorphology and land cover.

# 1 European Transfrontier Landscapes: Changes, Chances and Challenges

## 1.1 Introduction

In present times, the notion of 'a changing world' has become widely shared between large numbers of people everywhere. The worldwide trend towards similar information sources and technologies, unifying preferences and desires, common forms of communication as well as more direct and more frequent transfer of goods, capital and knowledge over large distances have become known as 'globalisation'. Being propelled by a range of rather diverse and diffuse forces, the direction and effects of globalisation are hard to predict or interpret. Given its abstract nature, globalisation is often more apparent by some of its negative effects, for example:

- exploitative resource management in poor countries by international companies;
- agricultural seed companies destroying the biodiversity of the planet and depriving subsistence farmers of their livelihood; and
- industrialisation leading to global warming and deterioration of atmospheric quality.

Nevertheless, the socio-political movements that paved the way for ending the injustice and inhumanity of a divided Europe, derive ultimately from an unprecedented empowerment of people that was largely fuelled by a new sense of borderless identity – a sign of the time in which globalisation is likely to have played a not insignificant role. Equally, the common goal of achieving sustainability in managing the earth's resources cannot be limited to specific places or regions, but requires the recognition of "one borderless world" in the Gaia sense of the term (Lovelock 1979). As this report is being published, the European Union is taking a major step towards widening its territory and overcoming traditional national boundaries. After successfully growing from six to 15 Member States, the European Union has now carried out on 1 May 2004 its biggest enlargement ever in terms of scope and diversity: Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic and Slovenia. Bulgaria and Romania are preparing for membership by 2007, while Turkey is not currently negotiating its membership.

Though much has been achieved already, Europe's recent social-political development has demonstrated that despite legal or political decisions, traditions and stereotypes as well as regions and borderlines will continue to exist and most likely will do so for some decades. Numerous achievements in the field of economic, environmental and social co-operation cannot hide the fact that national and sub-national administrative borders still have tremendous impact on the way land is being managed and planned, cities being built and developed and the environment being maintained and protected. As national and regional

capitals are generally located at the centre of their administrative territory, it seems that, with the exception of coastlines and major rivers, peripheral zones are frequently less developed, less populated and less accessible than central regions. Location at the national or regional periphery as well at the border to other territorial entities makes many transfrontier landscapes special in terms of their economic, social and environmental characteristics. These special characteristics include both positive as well as negative aspects. Box 1 lists some typical difficulties associated with transfrontier landscapes.

A close look at Europe's transfrontier landscapes demonstrates that despite the great biogeographic and cultural differences that exist between European countries such as Ireland, The Netherlands, Poland, Portugal and Greece, there are many commonalities related to the peripheral character of these landscapes and their direct exposure to other administrative territories. This is why transfrontier landscapes put national and international policies to the test, and why they challenge planners and scientists to develop specific tools and concepts. On the basis of 14 case

### **BOX 1. Difficulties associated with transfrontier landscape management and co-operation** (based on Hamilton *et al.* 1996).

1. Difficult terrain, inaccessibility, lack of roads or rail across national frontiers impede interchange.
2. Different (sometimes conflicting) laws may reduce the effectiveness of transboundary co-operation.
3. The need for co-operation may slow the response to emergency situations calling for rapid decision.
4. Religious or cultural differences can cause misunderstanding.
5. Language barriers may have to be overcome.
6. Differential commitment and resources on each side of border can lead to a dominant/weak situation.
7. The different levels of professional standards for corresponding staff may impede real equal partner twinning.
8. Differences in the authority given to designated area management staff may produce difficulties in transboundary co-operation.
9. A lack of parity with regard to the ratification of international protocols or conventions may prevent their being used for transboundary co-operation.
10. Two or more countries/regions may be at different stages of economic development and have incompatible policies related to resource utilisation, versus resource protection.
11. Armed conflict, hostility or political tension can make transboundary co-operation difficult, even impossible.
12. Technical incompatibility in communication, fire suppression equipment, GIS systems, etc. may impede transboundary co-operation.



studies across Europe, this report seeks to highlight the strengths, weaknesses, opportunities and threats related to the specific landscape characteristics and land-use trends in transfrontier landscapes.

## 1.2 Landscape Definition and Perception

Compared with the increasing impact of technological progress, dynamic economic fluctuation and the visual media, the concepts of land and nature appear as relatively stable – almost static – points of reference. This statement stands in obvious contrast to most of the recent scientific reviews and environmental reports which emphasise the ‘radical and dramatic changes in land use and landscape’ or the ‘unprecedented decline of nature’ and ‘dramatic losses of biodiversity’. Though these reports are based on objective facts and though many people can witness changes in the direct proximity of their living environment (e.g. highway construction, urban development, airport extension etc.), most landscape changes happen unnoticed by the wider European public. The increasingly urban populations experience landscapes in a spatially and temporally restricted fashion: mainly during weekend and summertime holidays in areas that are either protected, managed with state subsidies or without economic future perspectives.

Our collective cognitive ‘image of a landscape’ is hence likely to be divided into two main types: one of a never-changing postcard landscape (i.e. protected, non- or low-production areas) – a commodity item for our leisure time, and another one of peri-urban or intensively managed lands that are perceived as rather hostile or at least unattractive places (i.e. non-protected production areas). Unfortunately, one of the reasons for such differences in perception, namely ‘estrangement’, might also be attributed to the phenomenon of globalisation.

If landscapes are considered a human construct, the question arises whether landscapes that are not so perceived really do exist. According to Webster’s Dictionary (1913), ‘landscape’ is defined as follows:

‘Landscape’, n. [Formerly written also {landskip}.] [D. *landschap*; land land + schap, equiv. to E. *-ship*; akin to G. *landschaft*, Sw. *landskap*, Dan. *landskab*. See {Land}, {and} {-ship}.] **A portion of land or territory which the eye can comprehend in a single view, including all the objects it contains.**

The aspect of *recognition* by an individual observer is even more directly addressed by Steiner (1991): “Landscape is all the natural features such as fields, hills, forests, and water that distinguish one part of the surface of the earth from another part. Usually, a landscape is that portion of land or territory which the eye can comprehend in a single view, including all its natural characteristics”. Such a purely bioanthropological interpretation stands in contrast to spatial landscape concepts that have been and are being developed by geographical, remote sensing and landscape ecological sciences. The outcome could be a conflict between two

forms of objectivity, on the one hand the direct, individual experience (= *concrete, but subjective*) and on the other hand indirect or technical, expert interpretation (= *abstract, but measurable*). From the viewpoint of national perception and priorities, the spatially, socially and economically peripheral location of transfrontier landscapes must hence be considered as being especially interesting.

However, the unpredictable forces of globalisation might also alter the way people perceive landscape. Other than suggested by the definitions of Webster’s Dictionary and Steiner, individual, non-expert landscape perception is likely to build upon a knowledge-based sense of space and orientation. Future individual perception will be guided by new technical instruments (e.g. satellite-driven GPS instruments, computer-aided assessment tools, etc.) and supported by commonly available references. Drawing upon a variety of information sources, this will enable individuals to interpret landscapes as parts of larger coherent interconnected spatial systems and will allow them to identify and appreciate region-specific attributes in relatively easy ways. In short, technology will facilitate landscape-ecological knowledge to become a mainstream cultural item. In the case of transfrontier landscapes, this means that there will be more targeted information at hand to put them into the larger context of their overall regional, cross-border distribution.

As complex *socio-economic ecosystems* with regionally distinct configurations of geomorphology, soil, water, vegetation and human land use, landscapes are the products of both human activities and natural processes driven by policies, demography, economy or climate change. The degree to which human activities and natural processes are interacting or have been interacting in the past determines the *character* of a landscape. Landscape character can hence be considered as the land’s principle physiographic profile in terms of climate, geomorphology, topography, soils and the associated natural vegetation and land use. Though the character of a landscape can be the object of human perception and evaluation, character is not to be confused with the *quality* of a landscape, which is mainly dependent on the *functions* that have been assigned to it, e.g. aesthetic, recreational, economic and ecological.

Obtaining a record of the landscape character should hence be considered the necessary prerequisite for measuring the *state or quality* of a landscape and for identifying the most relevant *pressures* that affect this state.

## 1.3 European Transfrontier Landscapes Initiatives Arising from the Recent Past

Since the evolution of our cultural landscapes is inextricably linked with the growth of European civilisation, defining the true origins of transfrontier landscapes in their historical context can be considered as a monumental task and not within the scope of this report. This brief review will therefore mainly address

recent political and institutional developments following World War II, focusing mainly on the period after the fall of the Iron Curtain in 1989 and the European unification process thereafter.

Early transfrontier initiatives have been of a bilateral nature. On the eastern side of the Iron Curtain protected areas, such as the Šumava/Bohemian Forest and Podyjí/Thaya River Valley in the Czech Republic, were established – pioneering efforts pre-empting similar action on the western side. As Jan Cerovsky (1998) recalls: “Our conservationist friends in Hungary were developing a long time ago, deep in the ‘Cold War’ times, friendly relations with their Austrian colleagues, particularly in the area of the greatest Central European steppe lake – Fertő/Neusiedler See. The lake, divided artificially by the state frontier between Austria and Hungary, is now a bilateral National Park and Biosphere Reserve. According to statements by the managers of both parks, this arrangement contributes to the mutual understanding and friendship between the Austrian and Hungarian nations. A historic excellence: the area of the Fertő/Neusiedler See was the first place where the Iron Curtain was abolished, the fence removed. This happened in the spring of 1989 – and for nature conservation reasons.”

In the IUCN/WCPA Programme ‘Parks for Life: Action for Protected Areas in Europe’, frontier parks along the former Iron Curtain have been considered to play an important role in bridging socio-cultural and environmental gaps. In ‘Parks for Life’ transfrontier co-operation has been one of the priority items (IUCN 1990; IUCN 1999). A major international workshop held in Australia in 1995 focused on transboundary protected area co-operation in mountain areas and provided further impetus for following initiatives such as the Transboundary Protected Areas for Peace and Co-operation, WCPA. The United Nations University for Peace has promoted the concept of a global partnership to promote the objectives of Parks for Peace for “protected areas where there is a significant conflictive past” (Budowski 1998). It should be noted that these guidelines reserve the term Parks for Peace for the particular subset of protected areas where there is a clear biodiversity as well as peace objective and where there is co-operation between at least two countries or sub-national jurisdictions. The organisations that have contributed towards the establishment of a set of guiding principles and practices in the framework of the Parks for Peace concept include the World Wide Fund for Nature (WWF).

In 1993, Hanns Langer (WWF Austria) was the key driving force behind the ‘Ecological Bricks for Our Common House Europe’ initiative which identified 26 potential sites for protected areas – mainly along the former Iron Curtain. Though this initiative never fully materialised, it was crucial in attracting the attention of European institutions and the wider public.

In 1998, a major international conference on the European integration process held in Krakow (Poland) made strong reference to the former East-West-divide by

using the title “The Green Backbone of Central and Eastern Europe” (Nowicki 1998). However, unlike its predecessors that were mainly concerned with cross-boundary issues, the resulting Krakow Declaration was addressing Europe as whole. The participants affirmed that at the European instrumental level, Natura 2000 and the Bern Convention Emerald initiative are the two principal European instruments at the present time to realise the basic structure of the network in practice, while involving the expertise and experience as regards criteria and international designations from other relevant international instruments, and building on national, regional and local policies, expertise and experience, including protected area systems. Under the heading of ‘Ecology and Economy’ the Krakow Declaration addressed specifically the challenges for Central and Eastern Europe, namely:

1. That the privatisation of land and other resources require regulatory controls and contractual agreements to ensure that the use of such resources will prevent possible ecological and economic losses.
2. That the process of integration of CEE countries into the EU will explicitly take into account the enormous problems of preserving nature within economies undergoing rapid transformation, and therefore a review of existing financial and fiscal instruments in favour of stimulating environmental investments is called for, with special emphasis on agricultural policies and technical infrastructure, on the one hand, and ecological considerations on the other.
3. That it is necessary to reinforce local input into decision-making, through democratisation and decentralisation, about natural assets within the framework of national and European considerations and objectives for maintaining a common natural heritage.

It should be noted that the earlier transfrontier initiatives were mainly concerned with nature conservation and biodiversity issues and that the wider socio-economic and cultural aspects of landscapes were mainly seen in their nature conservation and management functions rather than values in their own right.

## 1.4 European Policy and Funding Initiatives

### European Landscape Convention (Council of Europe)

On 20 October 2000, the Council of Europe’s Committee of Ministers adopted the European Landscape Convention and decided to open it for signature during the ministerial conference on landscape protection in Florence, Italy. The convention aims to encourage public authorities to adopt policies and measures at local, regional, national and international level for protecting, managing and planning landscapes throughout Europe. It covers all landscapes, both outstanding and ordinary, that determine the quality of people’s living environment. The text provides for a flexible approach to landscapes whose specific features call for various types of action, ranging from strict conservation through protection, management and improvement to actual creation.

The idea to draft a new legal text for better management and protection of the continent's landscapes was first proposed by the Council of Europe's Congress of Local and Regional Authorities (CLRAE) in 1994. It received strong political support from both the Parliamentary Assembly and the Committee of Ministers as part of the Council's work on natural and cultural heritage, spatial planning, environment and local self government.

The convention proposes legal and financial measures at national and international levels, aimed at shaping 'landscape policies' and promoting interaction between local and central authorities as well as transfrontier co-operation in protecting landscapes. It sets out a range of different solutions which States can apply according to their specific needs. The Council of Europe intergovernmental committees will be supervising the convention's implementation. The text also provides for a Council of Europe Landscape award to be given to local or regional authorities or an NGO which introduce exemplary and long-lasting policies or measures to protect, manage and plan landscapes.

While several international policies suggest the need for reliable and targeted information on the state and trends of European landscapes, it is chiefly the European Landscape Convention (ELC) that requires Parties to carry out research and studies in order to identify landscapes and analyse their characteristics and the dynamics and pressures which affect them. The Explanatory Report of the ELC (Council of Europe 2000) states: *Some countries have already performed nationwide surveys of landscapes. This work has revealed the landscape distinctiveness of different areas, each with its own mixture of natural and man-made elements. Geographical information systems and modern techniques of computerised mapping, also at urban level, are used to show up landscape characteristics, such as the physical relief, the settlement pattern, the main land uses, economic activities, residential areas, the presence or absence of features such as hedgerows and terraces, important wildlife habitats and the heritage of past human activity.* (Paragraph C: Identification and evaluation).

Another important requirement is the need for **transfrontier programmes**. According to the Explanatory Report on Article 65 the parties are requested to *set up transfrontier programmes for the identification, evaluation, protection, management and planning of landscapes which straddle borders. In doing so, they are asked to rely as far as possible, in accordance with the subsidiarity principle defined by the European Charter of Local Self-Government, on local and regional authorities, and to use the implementation tools*

*advocated in the European Outline Convention on Transfrontier Co-operation between Territorial Communities or Authorities in Europe of 21 May 1980 and its protocols.*

This project is meant as a contribution to Theme 2 of the preparatory work for the coming into force of the European Landscape Convention: *Landscape identification, assessment and quality objectives, using cultural and natural resources.*

### **INTERREG and PHARE-CBC (European Union)**

At the level of the European Union cross-border co-operation also became a key policy issue. In order to advance with the European integration process, the European Commission launched in 1989 the Community Initiative INTERREG aiming at a borderless economic and social development. In 1995 the INTERREG Initiative was supplemented by the Phare Cross-Border Co-operation Programme for Central and Eastern Europe (PHARE-CBC, CEC 1998) promoting cross-border co-operation with and between Accession Countries (Austria and the Czech Republic participated in the INTERREG IIA-PHARE-CBC Programmes 1995-1999) which created new impulses for intensifying cross-border co-operation along the common borders. Within the scope of the negotiations on AGENDA 2000, the European Council passed a resolution to continue the Community Initiative INTERREG and defined it as the one to receive the largest amount of funding of all Community Initiatives especially with a view to EU enlargement in the programming period 2000-2006 as well as to improve the programme in collaboration with PHARE-CBC. EU enlargement is one of the most important integration measures on the way to a peaceful, economically and socially stable Europe and also poses one of the greatest challenges to the Union. The border regions will be the areas mainly affected by the opportunities and risks of the enlargement process. In the view of the programming partners, the creation of an integrated, socially compatible economic area across historic borders is considered a major prerequisite for successfully coping with these challenges. In 1999, the Republic of Austria and the Czech Republic as well as Slovakia, Hungary and Slovenia entered into a 'Joint Declaration on the Co-ordination of Cross-border and Transnational Co-operation Programmes' in which they officially declared their willingness to develop common border regions in the light of the coming enlargement. The issue of cross-border co-operation with a view to accession was emphasised at the European Council in Berlin and was welcomed in the Joint Declaration. The new INTERREG III Guidelines 1 and the PHARE-CBC Regulation form the basis for the joint INTERREG III A/ PHARE-CBC Programme for the period 2000 to 2006.

## 2 Landscape Character Assessment Tools

### 2.1 Introduction

An analysis of the existing monitoring programmes at the national level shows that Landscape Character Assessments have become an important tool for the conceptual and spatial integration of a wide range of factors relevant for the state and trends of terrestrial ecosystems. The large diversity of landscapes characteristics – especially at the European level – must be considered as a key methodological challenge when assessing the vulnerability and resilience of terrestrial ecosystems with regard to pressures from land use and land cover changes. Landscape characteristics such as topography, soil type, vegetation, structural elements (e.g. hedges, trees) and land-use patterns form the life-support systems for terrestrial ecosystems. The objective of a harmonised landscape character assessment is to develop reliable indicators and a geographic reference base that allows assessing the role and function of landscape management for the protection/conservation of important natural and semi-natural landscapes in Europe.

### 2.2 Landscape Character and Quality

*Landscape Character* is a distinct and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse. The elements of landscape depend on the *combination* of factors such as geology, land form, soils, vegetation, land use, field and human settlement patterns; factors may be considered in their past, present and/or future contexts. Character definitions highlight the interrelationships of biophysical *and* cultural factors, including socio-economic aspects. Landscape Character can hence be seen as an expression of the way in which the natural and cultural elements of terrestrial ecosystems combine to create unique places with specific ecological, economic as well as social functions and values (Groom *et al.* 2003).

Landscape Character Assessment comprises a set of tools that are scientifically sound, region-specific and stakeholder orientated, designed to describe the character of a landscape. It concentrates on what makes one area different or distinctive from another and can result in one or both of the following:

- landscape character types (these may be generic classifications or typologies)
- landscape character areas (these are single and unique areas that may capture a 'sense of place' for people).

The assessment can be applied at a range of scales, from the national, though to the regional and local. (Groom *et al.* 2003). The end product of characterisation

is normally a map of landscape character types and/or areas, together with relatively value-free descriptions of the character and the key characteristics that are most important for defining this character. The characterisation of areas does not necessarily involve making quality evaluations about them (except insofar as we have to decide what aspects are essential to character).

*Landscape Evaluation* is based on the results of the characterisation process and involves making evaluations about landscape character to inform particular decisions related to the application. For example the landscape characterisation may be used as an input into natural resource management, regional development planning, designing special areas for protection or targeting agri-environmental measures in multifunctional landscapes. The characterisation process may also be used as a framework for, or as an input into, the identification or evaluation of ecosystem or landscape functions for wider assessment applications. Of course, the characterisation and evaluation parts of landscape study cannot be entirely separated. Landscape Character Assessment techniques try to minimise the latter, and focus mainly on the more 'factual' aspects of landscape.

Though Landscape Character Assessment has been welcomed as a procedure for identifying a landscapes' main biophysical as well as cultural profile, a critical debate has evolved on whether landscape evaluation techniques cannot be applied directly, questioning the necessity of a character assessment (Eagar 2003). While the authors would agree that in some occasions and depending on the research question and policy context, direct landscape evaluations can provide the required information, we feel that the large variety of landscape types and perceptions at the international level, Landscape Character Assessment must be considered a vital first step for establish a first framework for further assessments. Without such a 'neutral' common reference base, there is doubt whether the results of international landscape evaluations could ever find the acceptance of the regional or national researchers, policy makers and stakeholders.

### 2.3 European Landscape Map and Typology

Given the increasing demand for high-accuracy landscape information at the European level (Wascher 2003), and the observation, that existing approaches fall short of using state-of-the-art technology and addressing cultural attributes (e.g. land cultivation patterns, historical features, landscape elements, land use characteristics), there is a clear need to establish a classification and map for Landscape Character Types at

the European level as a main point of reference in support of both research and policy implementation at the European and national level. The strategic objectives are as follows:

- Establish a European-wide neutral and culturally unbiased typology of landscape types that is based on high quality data of European coverage and which can be linked to existing national approaches while linking up with the European bioclimatic regions;
- Make sure that the proposed landscape types provide a meaningful reference base for policy application, e.g. the European Landscape Convention (Council of Europe), Agenda 2000 (rural development), reporting according to the DPSIR framework (Driving Force – Pressure – State Response); ESPON spatial planning, etc.

A European landscape mapping project should provide a practical and easy tool for European policy implementation. Important applications are integrated environmental assessment, monitoring and reporting, especially indicator-based approaches.

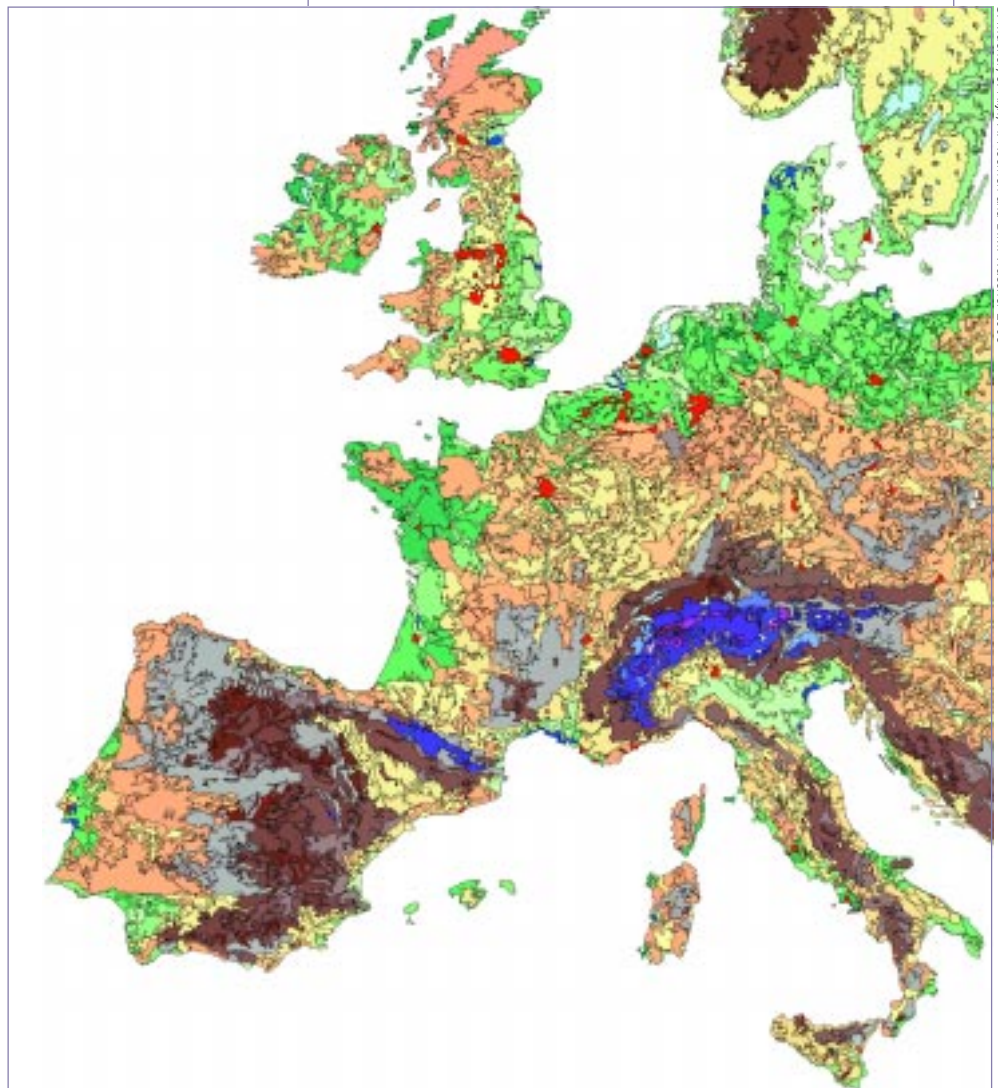
After formulating user requirements and possible target groups (see above), a critical review of the main

European environmental data sets has been undertaken in order to select the following suitable core data sources for the delineation of the major landscape units:

- Topography (GTOPO30, grid data, 1 km resolution)
- Parent material/ Ecological stand conditions (ESDB 1:1M, vector data)
- Land use/Land cover (CORINE land cover database, vector data, 1:100 000).

The choice of data sets reflects that landscapes are a product of natural and cultural driving forces. Since a reliable European map on geomorphological aspects was not available, information on topography and parent material has been chosen as the adequate substitute. These three core data sets determine the matrix for a European Landscape Map. Specific landscapes, such as wetlands or bocages will be delineated within this matrix on basis of additional data sources. For the segmentation of the major landscapes the software package eCognition has been used. This is an object-oriented image classification software for multi-scale analysis of Earth Observation data of all kinds. The image classification is based on attributes of image objects (semantic information) rather than on the attributes of individual pixels.

**FIGURE 1.**  
**Draft European Landscape**  
**Typology Map.**



S. Mucher, J. Klijn, A. Koornen and D.M. Wascher 2003

The resulting European Landscape Map is demonstrated in Figure 1. The landscape map is an Arcview shape file with 2,682 landscapes mapping units of which more than 2,600 are larger than 2,500 ha. Each of the 202 landscape types has a unique code and the landscape type itself is the LCC code. The LCC code is based on the dominant altitude class, parent material class and land use class. The current landscape classification is now being distributed and revised by a limited number of landscape experts and on basis of their comments the landscape map will be improved. In 2004 the landscape map will be extended to the rest of Europe. Outside the European Union and the accession countries databases like CORINE land cover and the European Soil database are not available, which limits the possibilities.

The final typology consisting of 202 landscape types has a 3-digit code; the first capital letter is used for the topographic class, the second capital letter for the parent material and the third letter (undercast) for the land-use class (Figure 2).

As an extra attribute the environmental zone (e.g. Alpine south, Nemoral, Pannonian) has been attached to each landscape mapping unit. For the urban landscapes the information was derived from the CORINE land cover database. However, some extra processing was done to derive only the larger urban agglomerations. For this purpose a 5 km by 5 km majority filter was used in ERDAS Imagine.

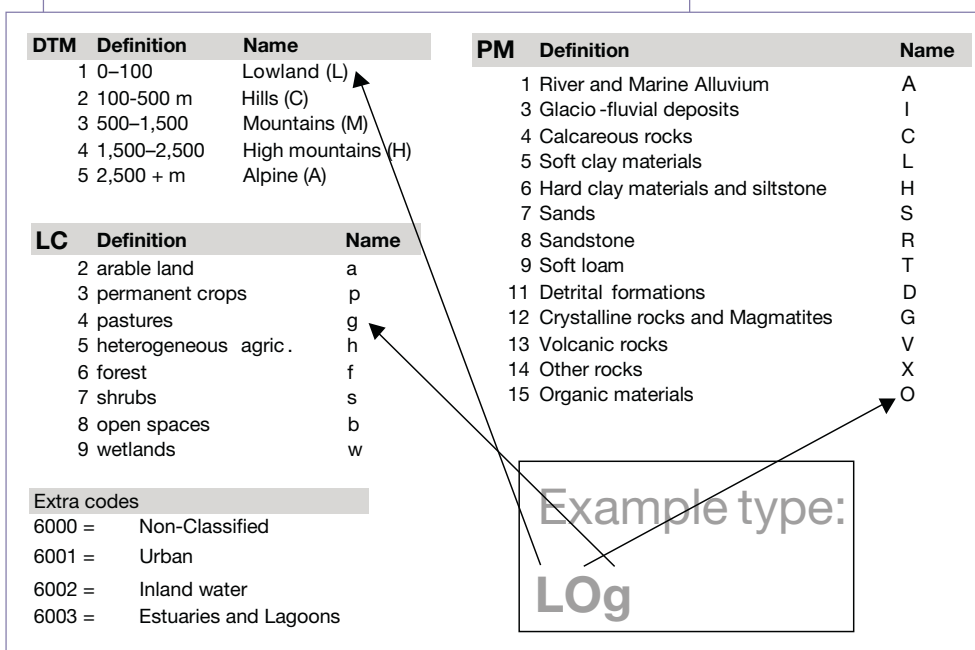
A great advantage of the European Landscape Classification is that its selection of boundaries is consistent, crisp and transparent based on the underlying layers: topography, parent material and land use. However, if misclassifications do occur in one of the three underlying layers this is reflected in the European Landscape Classification. The fact that the European Landscape Classification lacks information on the land-use history is a limiting factor but was so far difficult to collect at the European scale.

An example from the landscape type 'LOg' illustrates the future elaboration of the landscape legend (see Figure 2). This code represents Lowlands (L) with elevations around the medium sea level. Peat is the organic parent material (O) showing no significant elevations. The thickness of the peat layer differs from one metre to over 10 metres. Specific land forms are relatively rare but water bodies are present in the form of former creeks or peat rivers. The landscape is very open with a characteristic pattern of land reclamation where parcels are narrow and very long. In some areas these pattern have remained relatively unchanged over the past 1,000 years. Land use is mainly pasture (g) because the soil water table is just beneath the soil surface (Mücher *et al.* 2003).

## 2.4 Landscape Indicator Development

Obtaining a record of the landscape character should be considered the necessary prerequisite for identifying *state or quality* indicators for landscapes and for identifying the most relevant *pressure* indicators, that affect this state. Mainly driven by the critical debate about and the strategic perspectives for the future of Europe's Common Agricultural Policy (CAP) in the light of the WTO negotiations, environmental quality concerns and the EU Accession process, the development of landscape indicators at the European level has entered both the policy and the research world. The following two definitions of indicators might guide the analysis: '*An indicator is a means devised to reduce a large quantity of data down to its simplest form retaining essential meaning for the questions that are being asked of the data*' (Ott, 1978) and: '*The indicators show changes over time for each criterion and demonstrate the progress made towards their specified objective*' (MCPFE, 1998).

Many countries have taken a rather proactive approach towards the implementation of indicator-based landscape assessments. In recent years, a series of



**FIGURE 2. Coding system for landscape typology based on topography (DTM), parent material (PM) and land use (LC).**

countries have developed more refined methodologies in terms of spatial resolution and policy orientation, resulting in impressive monitoring and reporting products at the national level. Landscape indicators fields on management and value are clearly less strongly developed. It can be assumed that a target approach towards the population of these indicator fields with existing data could provide a substantial advance in terms of cross-national comparisons. It requires a systematic approach when identifying the main types of management schemes and the accompanying financial structure.

Landscape structure is the indicator field that is most commonly in use and where an increasing number of techniques (e.g. Geographic Information Management) are being developed. The analysis of landscape structures is most commonly performed in countries that are undertaking 'Landscape Character Assessments' and where national landscape typologies as references for indicator assessments and interpretation are being developed. Landscape Character Assessments based on landscape typologies take a more region-specific approach than pure structure-analytical techniques. National activities are increasingly supported by international projects such as the European Landscape Character Assessment Initiative (ELCAI, co-ordinated by Landscape Europe), the Environmental Risk Assessment for European Agriculture (ENRISK, co-ordinated by the European Centre for Nature Conservation), the Land Use and Land Cover Area Sampling (LUCAS, co-ordinated by the European Statistical Office) and the Millennium Assessment that includes a section on cultural landscapes.

### Example: Greece

As an example we present the analysis of the landscape structure and pattern in the north west part of the Mygdonia Basin (Lagkada County, see Case Study V). A satellite image Landsat 7 of Lagkada (30 x 30 m) was used as input. After statistical analysis of the radiation levels, 10 categories of land uses were identified (dense forests, open forests, dense shrub lands, open scrublands, agricultural areas, grasslands, bare grounds, lakes, clouds and shadows). The processed satellite image was introduced to the Arc View 3.2a environment. Then, as a substrate to the geological map, the watershed map, the hydrological network map, and the municipal district map were added.

The selection of sampling units was made using the following criteria:

- Belonging to different municipal districts (socio-economic factor). This way the effect of man on landscape character of every municipal district was examined.
- Belonging to different watersheds (physiographic factor). This way the effect of hydrographic network on landscape character was examined.

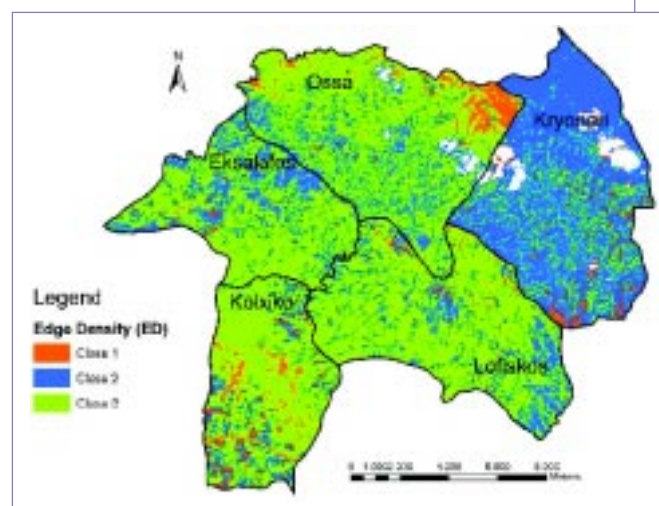
As a result, 34 sampling units were finally designated and afterwards landscape indicators were calculated with the programme Spatial Statistics του ArcView 3.2a. Twenty-nine different indicators were calculated using the Fragstats analysis. In total, in the landscape level, 17 indicators were used (Table 1).

For the selection of an adequate number of indicators a Principal Component Analysis (PCA) was conducted. Furthermore a One-way ANOVA was conducted to discover which indicators appear to have statistically important differences between the three sub-watersheds. Finally the indicators, where calculated, for all the municipal districts.

### Map and Landscape Profile

An example of Transfrontier Landscapes between the municipal districts is shown in Figure 3 – the effect of different socio-economic conditions in land uses according to each community is obvious. The distribution of the patches for each class of land use identifies the borders of the municipal districts. In particular the landscape structure of Ossa differs from that of Kryoneri, since in Ossa there were many land use changes whereas land uses have remained the same in Kryoneri.

**FIGURE 3. Map with the classes for the indicator Edge Density (ED).**



**TABLE 1. Categories of landscape indicators in landscape level.**

| Category   | Indicator                                      |
|--|--|
| 1. Patch Density, Patch Size and Variability Metrics | Number of Patches (NUMP)                       |
|  | Mean Patch Size (MPS)                          |
|  | Median Patch Size (MedPS)                      |
|  | Patch Size Standard Deviation (PSSD)           |
|  | Patch Size Coefficient of Variance (PSCOV)     |
| 2. Edge Metrics                                      | Total Edge (TE)                                |
|  | Edge Density (ED)                              |
|  | Mean Patch Edge (MPE)                          |
| 3. Shape Metrics                                     | Mean Perimeter/Area Ratio (MPAR)               |
|  | Mean Shape Index (MSI)                         |
|  | Area Weighted Mean Shape Index (AWMSI)         |
|  | Mean Patch Fractal Dimension (MPFD)            |
|  | Weighted Mean Patch Fractal Dimension (AWMPFD) |
| 4. Diversity and Interspersion Metrics               | Mean Nearest Neighbour (MNN)                   |
|  | Interspersion Juxtaposition Index (IJI)        |
|  | Shannon's Diversity Index (SDI)                |
|  | Shannon's Evenness Index (SEI)                 |

## 3 Objectives and Approach for Transfrontier Landscape Assessment

### 3.1 Project Objectives

The overall objective of this report is to illustrate a variety of typical examples for the overall character, management, planning and conservation of transfrontier landscapes in Europe. According to this report, transfrontier landscapes are defined as follows:

*A transfrontier landscape is a piece of land where natural and cultural characteristics form recognisable coherent entities which are divided by national or sub-national administrative boundaries, resulting in two or more areas of sovereignty or jurisdiction.*

In order to qualify for a transfrontier landscape according to the definitions of this report it is not necessary that countries or regions have (already) entered a certain form of cross-border co-operation. However, since the selection and proposal of case studies is based on national expertise, some of the identified transfrontier landscapes are recognised national and regional showcases, such as the open woodland landscapes (called *dehesas* in Spanish and *montados* in Portuguese) consisting mainly of holm, cork and quejigo oaks, or the previously mentioned Central European steppe lake – Fertő/Neusiedler Lake on the Hungarian/Austrian border. Other examples will be entirely unknown, even to experts.

The selected examples are analysed and described according to a common methodological approach (see following chapter) and illustrated in graphs and maps, displaying their key attributes with regard to their current state and trends. Though these selected examples represent only a small fraction of all European transfrontier landscapes, they can be considered to serve as test cases for future policy and research programmes in order to:

- identify and describe European transfrontier landscapes as special areas requiring international and national proactive support in terms of socio-economic and environmental development;
- initiate long-term co-operation between governmental authorities, resource managers and scientific experts across national or sub-national borders;
- promote sustainability strategies on the basis of landscape-ecological principles and land-use planning techniques;
- build trust, understanding, reconciliation and co-operation between and among countries, communities, agencies and other stakeholders;
- prevent and/or resolve conflicts over use of and access to landscape values such as recreation, cultural goods, scenery and biodiversity;
- seek synergy between agencies and funding organisations for research, planning and management of transfrontier landscapes; and

- increase communication through the dissemination and exchange of international or inter-regional documents.

The analysis and presentation of the 14 case studies is meant to initiate a critical discussion among policymakers, scientists and stakeholders on the future development of transfrontier landscapes in the context of sustainability principles, new forms of institutional co-operation and advanced data management capacities including the availability of landscape indicators and typologies.

### 3.2 Methodological Approach

The data gathering for this project followed a step-wise approach drawing upon the expertise of the Landscape Europe partners.

#### Step 1. Identification of which transfrontier landscapes to include in the report

The question of which area to select depended largely on the availability of existing data. This meant that only landscapes for which information in the form of reports, field studies, inventories, descriptions and other sources was already available could be selected. One of the prerequisites for making this selection was the need to identify a tangible area with clearly recognisable boundaries from the viewpoint of landscape expertise. This meant that it was necessary to refer to national or regional landscape typologies when identifying the landscape at the boundary. Although the co-ordinators made suggestions regarding the boundaries for which a landscape should be identified (e.g. between The Netherlands and Germany), it was up to the regional and national experts to propose other areas, if clearly better data was available. If more than one landscape fulfilled the criteria of data availability the final selection depended upon Step 2.

The identified transfrontier landscapes were supposed to be limited in size, in order to facilitate data collection and reporting. If there were different possibilities for selecting the size or concrete location of a landscape, it was suggested the matter be discussed in Step 2 before making a final decision on the selection. Since it could be expected that there are differences in the way two countries or regions classify or map landscapes (this was indeed one of the points of interest!), this was not to be considered as a problem but as part of the research interest (the two landscapes did not need to fit together perfectly as long as it was understood that they belonged to the same type).



## Step 2. Identification of the Transfrontier-Project Experts

In principle, the identification of the Transfrontier-Project Experts was done by the project co-ordinators and through the willingness of individuals who signalled their interest in contributing to this project. However, it could happen that two 'Transfrontier-Project Experts' (e.g. representatives from The Netherlands and Germany) do not have information on the 'same' (adjacent) type of landscape, e.g. if their landscapes of preference did not really connect. It was specifically requested that there was sufficient **information exchange** (communication) between Transfrontier-Project Experts before they continue with Step 3. One possible outcome of this information exchange was that another expert could be suggested to better match up with a partner. The co-ordinators made efforts to facilitate the exchange between the proposed partners and to help identify other possible partners if necessary.

## Step 3. Identification of existing reports or case studies

In order to make this peer-review feasible, it was suggested that existing reports or case studies on transfrontier landscapes be used in case these were identified in Step 1. Such reports or case studies could provide valuable insights and/or direct input to the final report and should provide – if possible – the basis for any additional data gathering. This was to avoid duplication of work.

## Step 4. SWOT Analysis: Strengths – Weaknesses – Opportunities – Threats

The selected transfrontier landscapes differ in terms of their character, status, trends and changes from country to country. Since each landscape is unique it was deemed useful to describe them individually as completely as possible and in a simple way. This can be achieved with SWOT analyses. The SWOT analysis is intended to highlight the key issues and the links between them in the landscapes described. In addition, changes that may need to be made within their management can be recognised.

SWOT stands for Strengths, Weaknesses, Opportunities and Threats. S and W relate to the landscape's own characteristics, which are seen as internal factors. The O and T deal with the landscape's competitive environment (external factors).

### *Strengths:*

- What are the advantages intrinsic to the landscape, e.g. environmental, geographical, reputation in the

country, uses? What makes it special for those surroundings?

- What is well organised? What is doing well?
- What are the best characteristics?

### *Weaknesses:*

- What can be improved?
- What is done poorly or inconsistently?
- What should be avoided?

### *Opportunities:*

What interesting trends or good opportunities are emerging? These may come from:

- changes in government policy related to the landscape described;
- changes in cultural and social trends (lifestyle trends, population demographics, education, recreation);
- changes in markets (agribusiness, tourism, commercialisation of regional products); and
- local events.

### *Threats:*

What obstacles does the landscape face? The most significant problems may be in the areas of:

- the environment: e.g. pollution;
- land/development: e.g. insufficient job opportunities, land use conflicts, uncontrolled countryside urbanisation;
- transport/communication infrastructure;
- general infrastructure e.g. water, health care, social and cultural facilities;
- management issues e.g. lack of vision or imagination, prescriptive regulations; or
- demographics e.g. population income, older age profile, low professional base.

SWOT analysis was first used in the 1970s as a tool for business management (Porter, Harvard University); in recent times SWOT analysis has reached wider fields of application and is commonly used to identify features and to solve conflicts of the territory. The most common approach is to make a qualitative SWOT analysis, describing Strengths, Weaknesses, Opportunities and Threats identified in the territory; this approach is normally used to identify development strategies in European regional policy, and it has also been used in Coastal Management projects, such as the MECO Project (Sanò 2002).

## Step 5. Data compilation, cross-analysis and report writing

This was by done by the editors of the report.

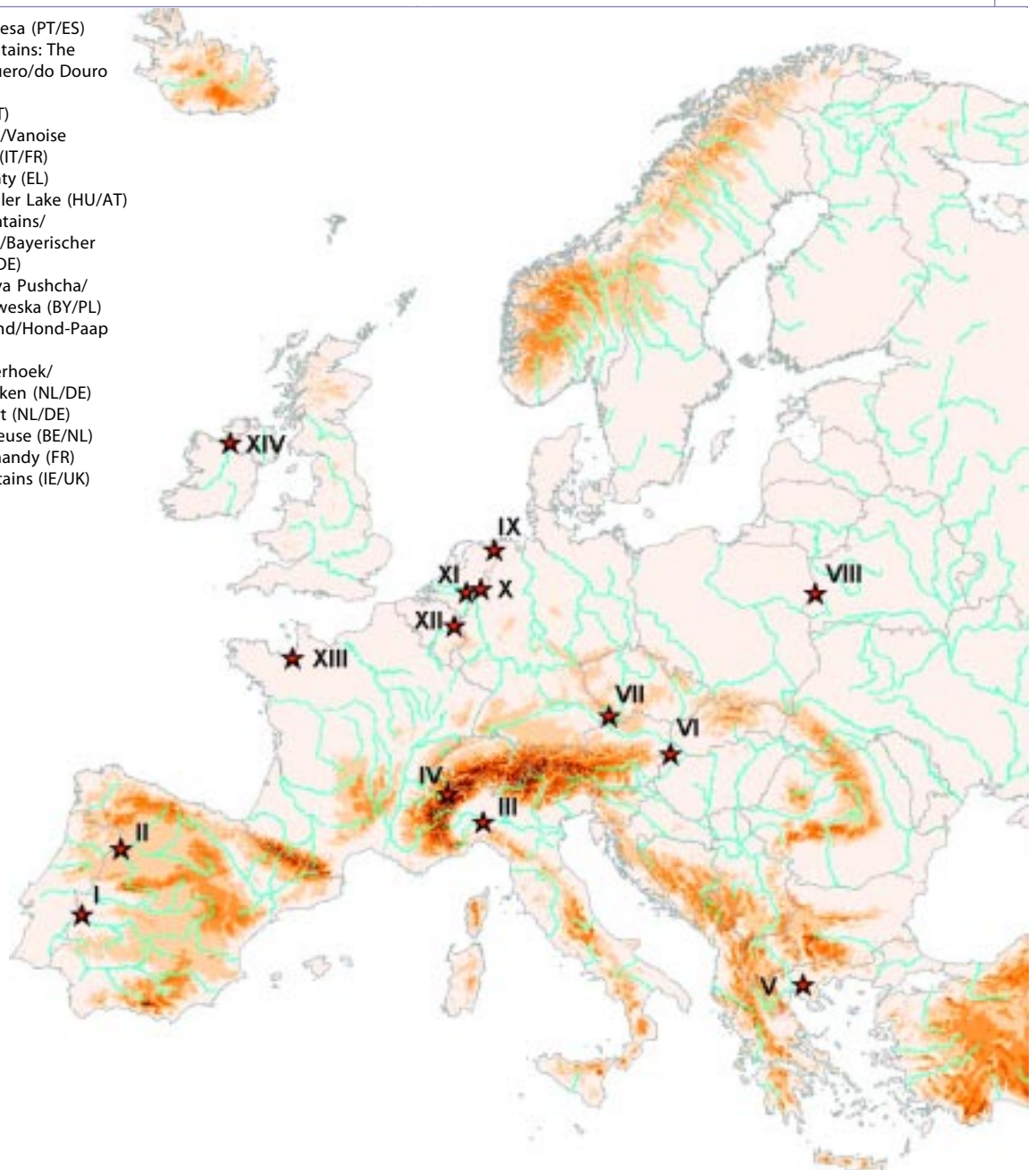
## 4 The Case Studies

The identification and selection of case studies for the assessment of transfrontier landscapes in Pan-Europe has been strongly guided by the geographic distribution of the expert network LANDSCAPE EUROPE. At a technical meeting of the EU Accompanying Measure project 'European Landscape Character Assessment Initiative' (ELCAI) in May 2003, Utrecht, LANDSCAPE EUROPE and ELCAI project partners received an

introduction to the transfrontier landscape project and were asked for volunteer contributions. During the project implementation more experts have been consulted, resulting in a total of 14 case studies distributed over pan-Europe (see Figure 4). While Mediterranean and Atlantic regions are rather well represented, East European landscapes are less well covered and Scandinavian landscapes not at all.

**FIGURE 4. Location of the Transfrontier Landscape Case Studies.**

- I Montado/Dehesa (PT/ES)
- II Atlantic Mountains: The Arribes del Duero/do Douro (ES/PT)
- III River Ticino (IT)
- IV Gran Paradiso/Vanoise National Park (IT/FR)
- V Lagkada County (EL)
- VI Fertő/Neusiedler Lake (HU/AT)
- VII Šumava Mountains/Bohmerwald/Bayerischer Wald (CZ/AT/DE)
- VIII Bielaviezhszkaya Pushcha/Puszcza Bialoweska (BY/PL)
- IX Hund-Paapsand/Hond-Paap (DE/NL)
- X Twente/Achterhoek/Bentheim/Borken (NL/DE)
- XI Gelderse Poort (NL/DE)
- XII The Border Meuse (BE/NL)
- XIII Brittany/Normandy (FR)
- XIV Breifne Mountains (IE/UK)



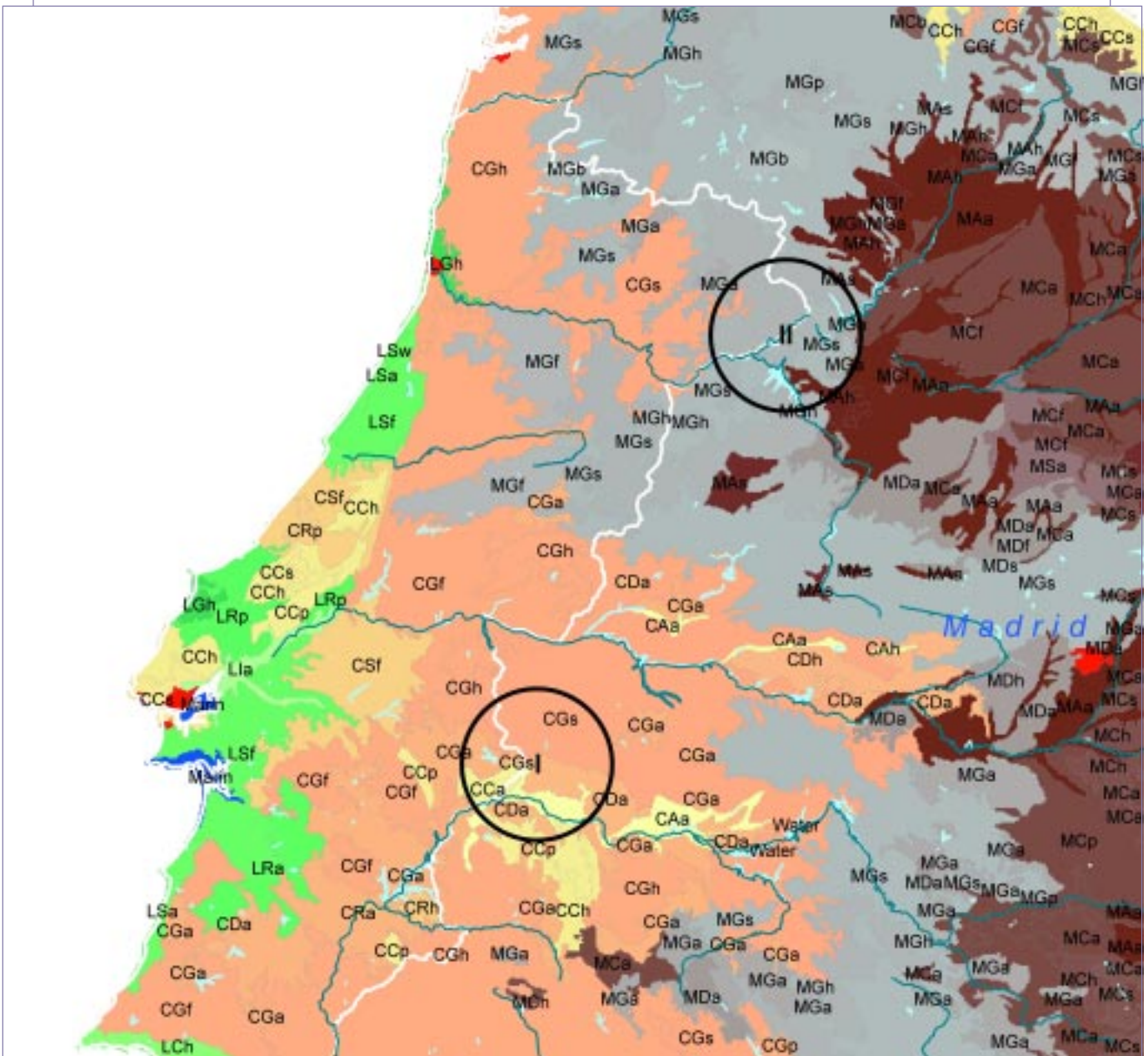
## 4.1 Mediterranean Landscapes

Compared to most other European regions, Mediterranean landscapes stand out in terms of their millennia-long cultural and land-use history. Their extremely small-scale spatial variability poses great difficulties to any form of generalisation. Of course there are a number of clearly recognisable common attributes such as the overall climate conditions with extremely low water availability coinciding with maximum temperatures, as well as overall poor soil conditions with low water retention capacity, and wildfires as part of natural ecosystem processes. Compared to northern European regions, Mediterranean vegetation types reflect the high level of variation in relief and are often marked by clear, abrupt boundaries resulting in *natural mosaic structures*, as compared to the more *cultural mosaic structures* that predominate northern countries. The degree to which

natural landscape diversity is influenced by climate and topography has become evident in recently developed European classification systems. In order to keep the 'considerably more heterogeneous' Mediterranean data manageable it was necessary to use a two-step procedure by dividing Europe into two zones and to use the principal components of the full set of variables for classifying northern and southern Europe separately (Mücher *et al.* 2003).

Without this methodological manipulation, northern natural variability, which of course exists, would have almost disappeared due to the dominant diversity of Mediterranean units. In this regard, Mediterranean landscapes appear as unique and offer a wide range of challenges for landscape ecology. For instance, Mediterranean landscape classifications are just recently beginning to appear. For Portugal and also the Azores a

**FIGURE 5. Transfrontier Case Study sites (I) Dehesa/Montado and (II) Arribes del Duero/do Douro at the Spanish-Portuguese border.**



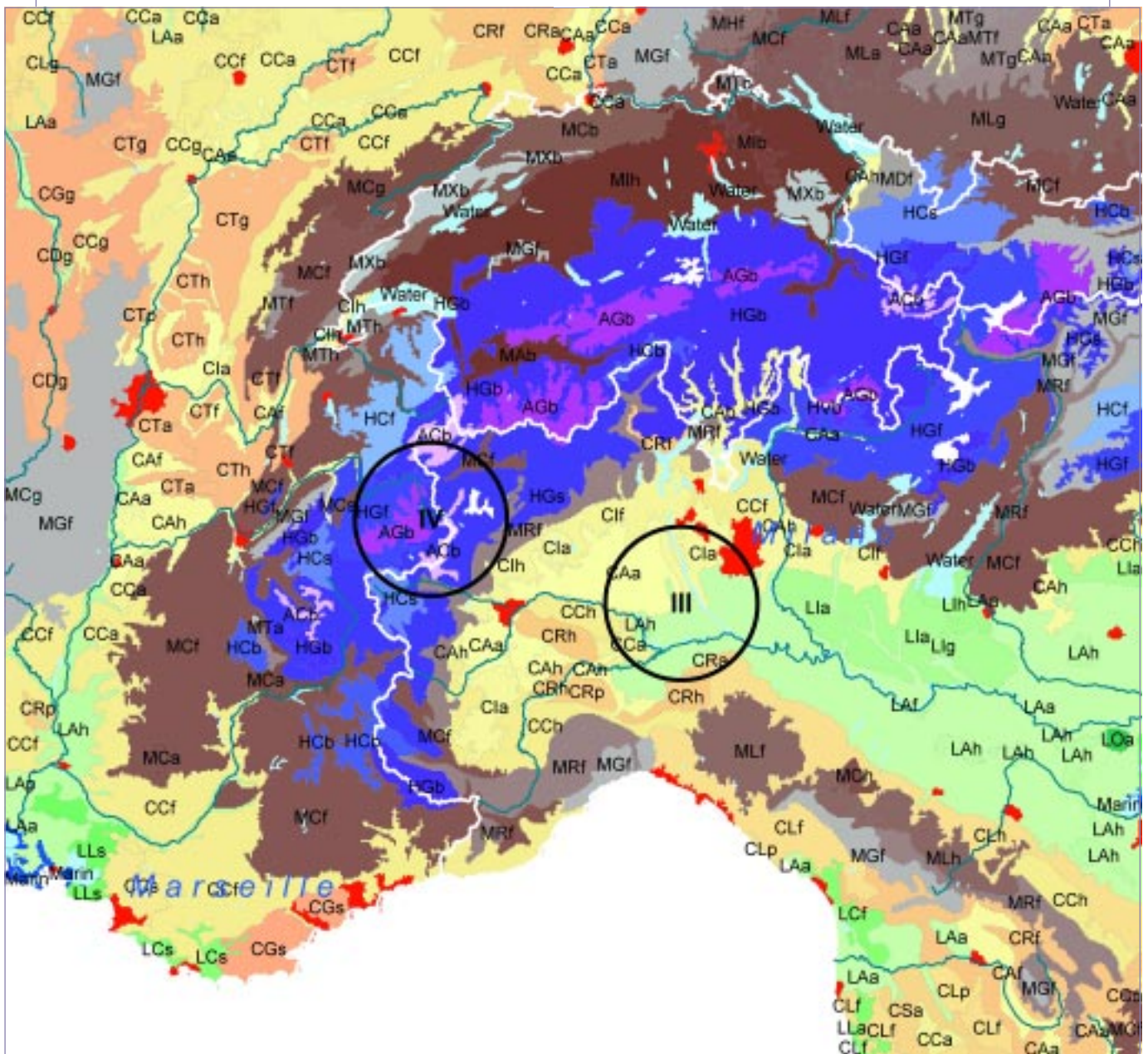
two-level hierarchical set of unique landscape character units has been developed (Cancela d'Abreu *et al.* 2001). The 128 Portuguese and 85 Azoric landscape units have been identified on the basis of map overlays combined with empirical knowledge and expert assessment. Only very recently, a new landscape atlas has been developed for Spain, (Mata Olmo *et al.* 2003), presenting 116 landscape types. As these examples illustrate, the number of landscape types provides only limited indication of true landscape diversity. This is mainly related to methodological aspects, the availability and selection of data and the purpose, all of which differ from country to country.

Due to the environmental and historical peculiarities offered by the geographic location and configuration (e.g. insularity, existence of peninsulas, climatic variability, habitat heterogeneity, etc.) the Mediterranean Basin is one of Earth's biodiversity hotspots. For

example, within the 2.3 million km<sup>2</sup> of the Mediterranean Basin at least 25,000 plant taxa occur, in other words, 1.6% of Earth's land surface contains ca 10% of all plant species (Quezel 1985). Roughly half of these species are endemic to the area, and ca 4,800 are endemic to individual countries. The evolutionary mechanisms of such diversification have been related to conditions and opportunities ultimately generated by the high spatial and climatic dynamics (Troumbis *et al.* 2001).

The aesthetic qualities of Mediterranean landscape are of direct economic value, as the growth of tourism in the region has demonstrated. Tourist arrivals in Greece during the period 1979–1986 increased from 5.8 to 8 million per year; coastal pine forests attract 97% of these tourists (Eleftheriadis and Tsalkikidis 1990). In Spain, visits to national parks increased from 2.4 million visits per year in 1984 to 7 million in 1994 (Wascher and

**FIGURE 6. Transfrontier Case Study sites (III) at River Ticino and (IV) Gran Paradiso/Vanoise National Park in Italy and France.**



Jongman 2004). While permanent crops cover 9% of the whole utilised agricultural area (UAA) in the whole of Europe, the same figure for southern Europe is about 20% (17% in Portugal, 19% in Spain, 20% in Italy, and 31% in Greece (Malassis 1992). Transhumance and nomadism are typical responses to landscape heterogeneity and climate. The movement of millions of animals in pursuit of the best environmental conditions, taking advantage of seasonal changes, is a form of sustainable management based on sound eco-geographic and socio-economic knowledge. The network of *cañadas* in Castille, *cami ramaders* in Catalonia, *drailles* in the Languedoc, *camäires* in Provence, *tratturi* in Italy, and others, are footprints in the landscape created by these farming methods (Mazurek and Blanchemanche 1992). Unfortunately, these types of livestock management have decreased substantially over recent decades, mainly due to socio-economic changes.

While landscape typology, statistics and scientific and economic data can provide guidance in the assessment of strengths, weaknesses, opportunities and threats, it seems impossible to succeed in collecting and describing the whole range of landscape diversity in the Mediterranean. "Though regarding its natural and human landscape, the Mediterranean crossroad, the heteroclitic Mediterranean, appears in our memories as a coherent picture, as a system where everything is mingled in order to recompose again in an original entity. How can we interpret this obvious entity, this profound essence of the Mediterranean? One should try over and over." (Braudel 1985).

### **Mediterranean case studies in the context of European Landscape Units**

The first case study is located at the central Spanish-Portuguese border and comprises the following landscape types:

- CGs: hilly chrystaline rocks with shrub vegetation
- MGs: mountainous chrystaline rocks with shrub vegetation
- CCa: hilly calcareous rocks with arable land use
- CCp: hilly calcareous rocks with permanent crops
- CDa: hilly detrital formations with arable land use.

Both the hilly and mountainous chrystaline rock formations are covering the largest areas of the *Dehesa*

and *Montado* landscapes stretching far into the central regions of the Iberian Peninsula. Therefore, Case Study I is the only one that is not only located within the indicated circle on the map, but expands substantially beyond it. The main vegetation cover is oak trees and shrubs. Arable land and permanent crops appear to be interspersed due to the more favourable soils on richer parent materials such as calcareous and detrital grounds.

The second case study is situated at the northern tip of the Spanish-Portuguese border and is dominated by MGs (mountainous chrystaline rocks with shrub vegetation), a landscape formed with steep hillsides. It has a level difference of more than 300 metres with graded relief between eroded Palaeozoic terrains and the Duero river gorges, where granite forms contrast with an open wide landscape and spaced out margins either side of the river which forms the borderline. The land cover is dominated by natural vegetation grazed by livestock, with shrubs, holm oak patches with cork oak and terraced landscapes with grapevines, olive trees and even some orange trees in the most thermal zones.

The third case study is located at the River Ticino, a tributary of the Po River (248 km), forming a boundary between two regions: Lombardy and Piedmont. Fluvioglacial sediment with forest cover lie on top of hilly clay grounds (CLf) forming a belt along the higher elevations of forested sandstone (towards the north-west) and calcareous mountains to the east and is the dominant landscape type at the upper part of the river course. The forested upper regions of the Ticino River border on the large landscape unit of the arable Po alluvial floodplain (LAa).

The fourth case study comprises mainly high mountainous and alpine regions of chrystaline or calcareous rock and magmatite parent materials with forest or open screen land cover (HGf, AGb and ACb) representing a typical alpine landscape. The mountains have been modelled from large glaciers and torrents until creating the current valleys.

The fifth case study, Lagkada County, is an example from Greece.

## CASE STUDY I Montado/Dehesa (Portugal/Spain)

**Ana Paixão Ferreira and Teresa Pinto Correia, Universidade de Évora, Portugal**  
**Rafael Mata Olmo, Universidad Autónoma de Madrid, Spain**



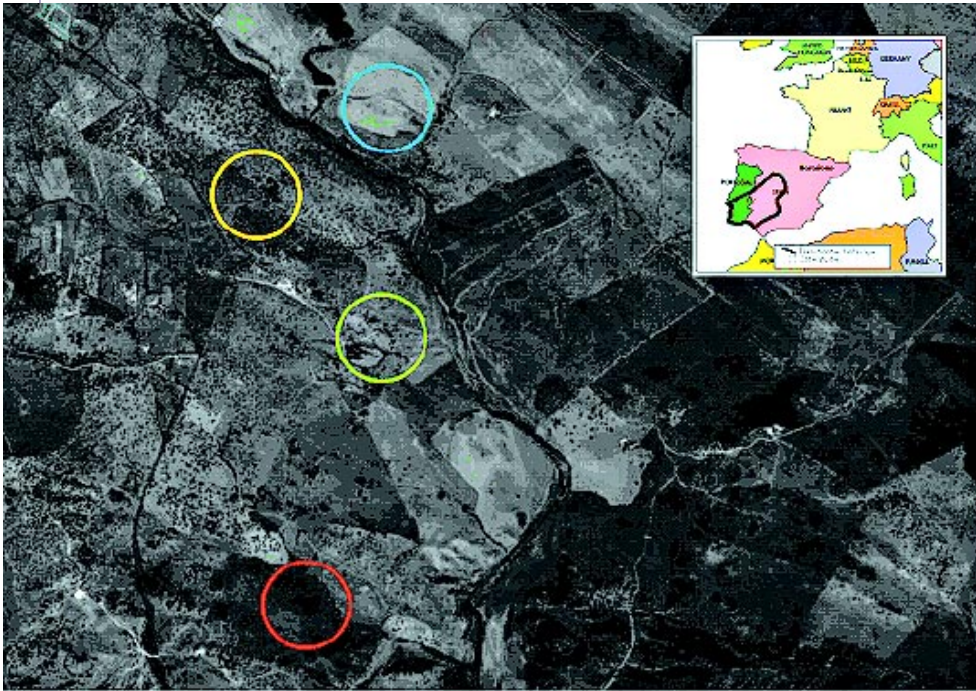
This landscape type, typical of large areas of southern Portugal (Alentejo) and south-western Spain (Salamanca, Extremadura and Andalucía) can be described as an open evergreen forest of cork and holm oaks, or like an open oak savannah, where the trees are found in various densities (from 20 to 60 trees per hectare) and an irregular pattern and the understorey can be more open, or more closed by shrub encroachment. It is found in areas of large farm properties, which can range from 100 to 1,000 ha or more, and corresponds to an agro-silvopastoral land-use system, characterised by a mixed and complementary use of the land. In the understorey there is rotation of cultivation, grazing and fallow.

The trees (mainly *Quercus suber* and *Quercus rotundifolia* but also *Quercus pirenaica*) provide not only cork and wood for charcoal production, but also shelter for livestock, and masts and acorns for feed. Cattle, pigs or sheep are raised on grass and tree fruits, and also eat the young tree shoots. Livestock density has to be regulated in order to profit from the available resources, and to balance the control of shrub development and allow natural regeneration of the trees. Livestock grazing also has a role in soil fertilisation. In Spain grazing has always been more important than crop cultivation in the understorey, while in Portugal, cereal cultivation, always in rotation with grazing and fallow, was normal until the 1970s and still occurs locally. Besides this aspect, there are no significant differences in this landscape and the corresponding system on both sides of the border.

This landscape type also includes another characteristic pattern: the *ruedos*, a small network of walls and paths near villages with diverse land use (olive trees, cereals, vineyards and some market gardens). The origins of the

system in the two countries relates to a multi-secular pasture vocation, through which the indigenous maquis has been transformed by progressively adapted management practices sensitive to the environmental constraints of the region and optimising the typical annual fluctuations in productivity. During the early Middle Ages (12th to 14th centuries) large municipal areas were divided up on Military Orders from the nobility and the municipal authorities (*concejos-concelhos*); the population lived in white villages with castles and *cortijos* (large, white farmhouses). Traditional dry stone walls mark these immense plots of land. There are different opinions about when the Montados/Dehesas appeared as such, but there is a general acceptance that grazing in open forest areas and a complementary use of the tree level and the understorey has existed for centuries in this area.

As well as their sustainability and complementary produce, the Montado and Dehesa landscapes are also valuable for their biological diversity, heterogeneity, cultural identity and recreation potential. Despite all these characteristics, the system has recently been undergoing a process of change, often leading to landscape imbalance and degradation. This has been due to socio-economic and policy changes, resulting in trends of extensification, abandonment or intensification of parts of the system, mainly in cereal or livestock production. Furthermore, many areas show signs of disease affecting the trees and leading to a decline of the system, but the causes of this disease as yet remain unclear. There are actually different sectoral measures such as agri-environmental schemes or forestry programmes available to support the Montados and Dehesas, but the challenge is to find out what is needed to support not just separate parts of the system but its whole, whether traditional or modern.

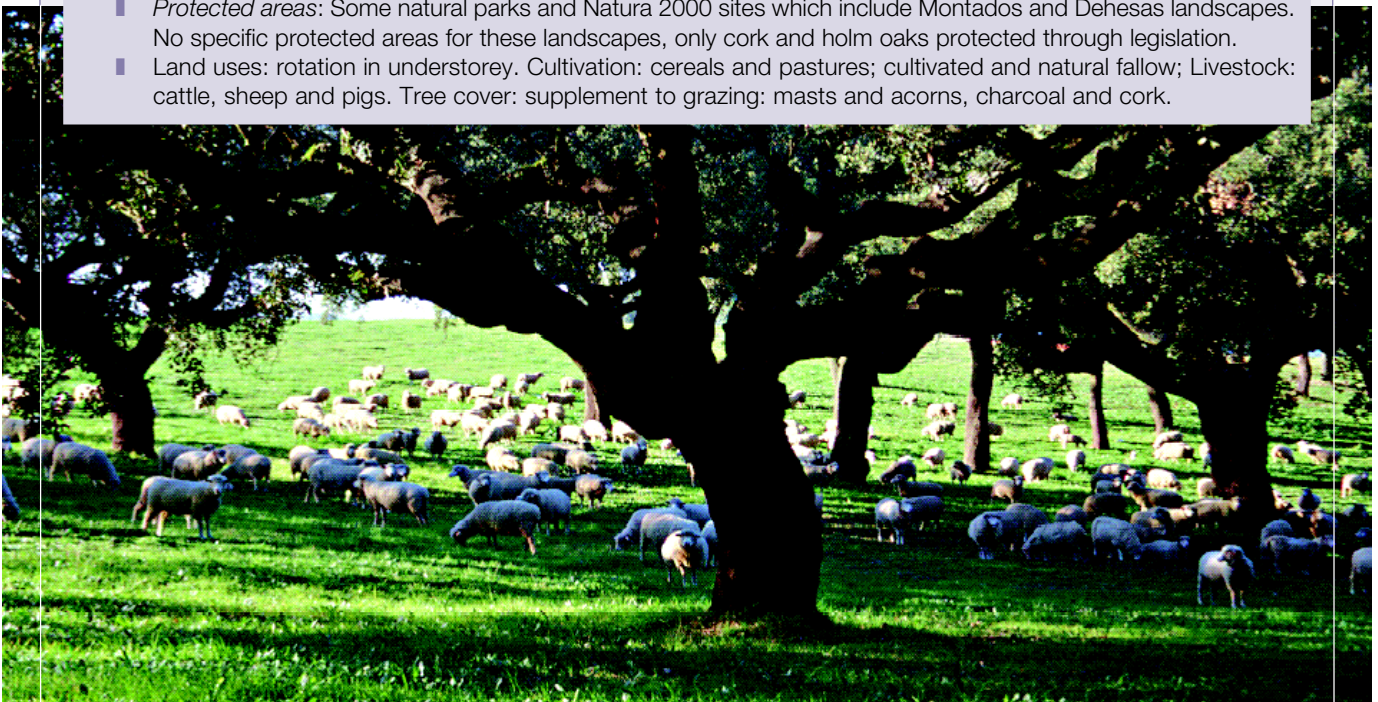


- Key:
- Strength: well-conserved Montado area
  - Weakness: abandoned area
  - Opportunity: multi-functional area
  - Threat: shrub

Scale: 1/20,000

## LANDSCAPE PROFILE

1. Landscape typology code: CGs (Upland chrysaline rocks with shrub vegetation), MGs (Mountainous chrysaline rocks with shrub vegetation) CCa (upland calcareous rocks with arable land use) CCp (Upland calcareous rocks with permanent crops) CDa (Upland detrital formations with arable land use).
2. Landscape name: Montado/Dehesa.
3. Landscape description:
  - *Climate*: Long dry summers where the temperatures often attain 30–40°C with an average precipitation of 300–800 mm concentrated in the period October–March, irregularly distributed and with annual fluctuations.
  - *Land forms*: Smooth wavy relief with some deep river valleys.
  - *Vegetation/species*: Trees: *Quercus suber*, *Quercus rotundifolia*, *Olea europea*, *Castanea sativa*, *Quercus pyrenaica*; Shrubs: *Quercus coccifera*, *Quercus lusitanica*, *Arbutus unedo*, *Cistus* sp., *Lavandula stoechas*, *Rosmarinus officinalis* and varieties of grass.
  - *Crops*: Cereals in rotation with grass and fallow, cork every 9–10 years.
  - *Landscape types*: Open evergreen forest with variable densities of tree and shrub understorey.
  - *Protected areas*: Some natural parks and Natura 2000 sites which include Montados and Dehesas landscapes. No specific protected areas for these landscapes, only cork and holm oaks protected through legislation.
  - *Land uses*: rotation in understorey. Cultivation: cereals and pastures; cultivated and natural fallow; Livestock: cattle, sheep and pigs. Tree cover: supplement to grazing: masts and acorns, charcoal and cork.



## SWOT ANALYSIS

### STRENGTHS

Heterogeneity in landscape and high biodiversity

Resilience to change in policies

Protection through legislation

Global care for the system by the land owners and awareness by other stakeholders

High cork prices

### WEAKNESSES

Weak market development for specific products

Low value of holm oak products

Properties too large: lack of innovation and low investment interest from land owners

No corridors in landscape: frequently no vegetation along paths, roads or watercourses

### OPPORTUNITIES

Strong potential for multi-functional landscape: hunting, recreation, aesthetic and cultural values

Increasing demand for quality food products: meat, cheese, hams, honey and mushrooms

New orientations of CAP and especially rural development regulation

Innovative uses of cork

Development of research in the system

### THREATS

Extensification and abandonment: shrub encroachment and tree decline; fire risks

Intensification: tree decline, no natural regeneration, increased erosion

Forest plantation with other species

Irrigation projects

Urbanisation in peri-urban areas

Increase in tree diseases

### REGIONAL CONTACTS

Alfredo Gonçalves Ferreira, Universidade de Évora, agf@uevora.pt

Ana Cristina Gonçalves, Universidade de Évora, Departamento de Engenharia Rural, acag@uevora.pt

António Gomez-Sal, Universidad de Alcalá, Dept. Interuniversitario de Ecología, antonio.gomez@uah.es

Begõna Peco, Universidad Autónoma de Madrid, Departamento de Ecología, begonna.peco@uam.es

Francisco Lopes, Direcção Regional da Agricultura do Alentejo, draal.florestas@mail.telepac.pt

José Ferraz, Universidade do Algarve, sfaisca@ualg.pt

José Garcia Perez, University of Central Lancashire, jdgarcia-perez@uclan.ac.uk

José Guilherme Borges, Instituto Superior de Agronomia, joseborges@isa.utl.pt

Manuel Pires da Fonseca, Universidade de Évora, Centro de Ecologia Aplicada, mpf@uevora.pt

Margarida Santos Reis, Faculdade de Ciências da Universidade de Lisboa, msr@fc.ul.pt

Maria Carolina Varela, Estação Florestal Nacional, mariacarolina-varela@clix.pt

Nuno António, ERENA, nuno.antonio@erena.pt

Nuno Ribeiro, Universidade de Évora, Departamento de Fitotecnia, nribeiro@uevora.pt

Pablo Campos Palacín, Instituto de Economía e Geografía de Madrid, pcampos@ieg.csic.es

Richard Joffre, Centre d'Ecologie Fonctionnelle et Evolutive, CEFE-CNRS, joffre@cefe.cnrs-mop.fr

Teresa Pinto Correia, Universidade de Évora, mtpc@uevora.pt

Victor Louro, Ministério da Agricultura, victor.louro@dgf.min-agricultura.pt

### USEFUL LINKS

<http://www.naturlink.pt/>

<http://www.icn.pt/> <http://www.dgf.min-agricultura.pt/>

<http://www.lpn.pt/>

<http://www.dgdrural.pt/>

<http://www.adena.com>

<http://www.min-agricultura.pt>

<http://www.agroportal.pt/>

<http://www.ceg.ul.pt/areas/detema.html>

<http://clio.rediris.es/geografia/dehesa.htm>

<http://www.wwf.es/home.php>

<http://www.ecologistasenaccion.org/madrid/natural/dehesas.htm>

[http://www.juntaex.es/consejerias/aym/dgpifa/RED\\_DEHESA/caract/dehesa\\_menu.htm](http://www.juntaex.es/consejerias/aym/dgpifa/RED_DEHESA/caract/dehesa_menu.htm)

[http://www.infoagro.com/forestales/aprovechamiento\\_dehesas.asp](http://www.infoagro.com/forestales/aprovechamiento_dehesas.asp)



## CASE STUDY II Atlantic Mountains: The Arribes del Duero/Arribes do Douro (Spain/Portugal)

Rafael Mata Olmo and Concepción Sanz Herráiz, Universidad Autónoma de Madrid, Spain



A significant part of the Spanish and Portuguese frontier is located along the deep valleys shaped by the main Iberic rivers: the Duero (Douro), between Tras-os-Montes and Castilla y León; the Tajo (Tejo), between Beira Baixa and Extremadura; and the Guadiana, between the Alentejo and the Algarve in Portugal and Extremadura and Andalucía in Spain. These rivers run down from the *Meseta* to the Atlantic Ocean cutting through major elevation ranges. Due to the sharp geomorphological divisions of land, they squeeze their way through the hard rocks of the *iberic zócalo* (baseboard/skirting board) forming a new 'frontier landscape' typically made of deep valleys, canyons and gorges.

The gorges formed by the Duero river between Paradela-Villardiégua de la Ribera and Pojares-La Fregeneda (Portugal and Spain respectively) are the narrowest and deepest of the whole Spanish-Portuguese border. They also define a type of landscape and a singular region at both sides of the boundary line, known as Arribes del Duero. The river, all along the arribes, changes in less than 50 km from 800 to 200 metres in height. The result is a landscape formed by steep hillsides with a level difference of more than 300 metres in certain places, and graded relief in the transitional areas between the superior *penillanuras* (eroded Palaeozoic terrains) and the gorges. The river course, with its rapids and pools, has been flooded by the construction of numerous

international dams that have transformed the landscape adding a wide sheet of mostly continuous water, sometimes interrupted by hydroelectric industries or waterfalls.

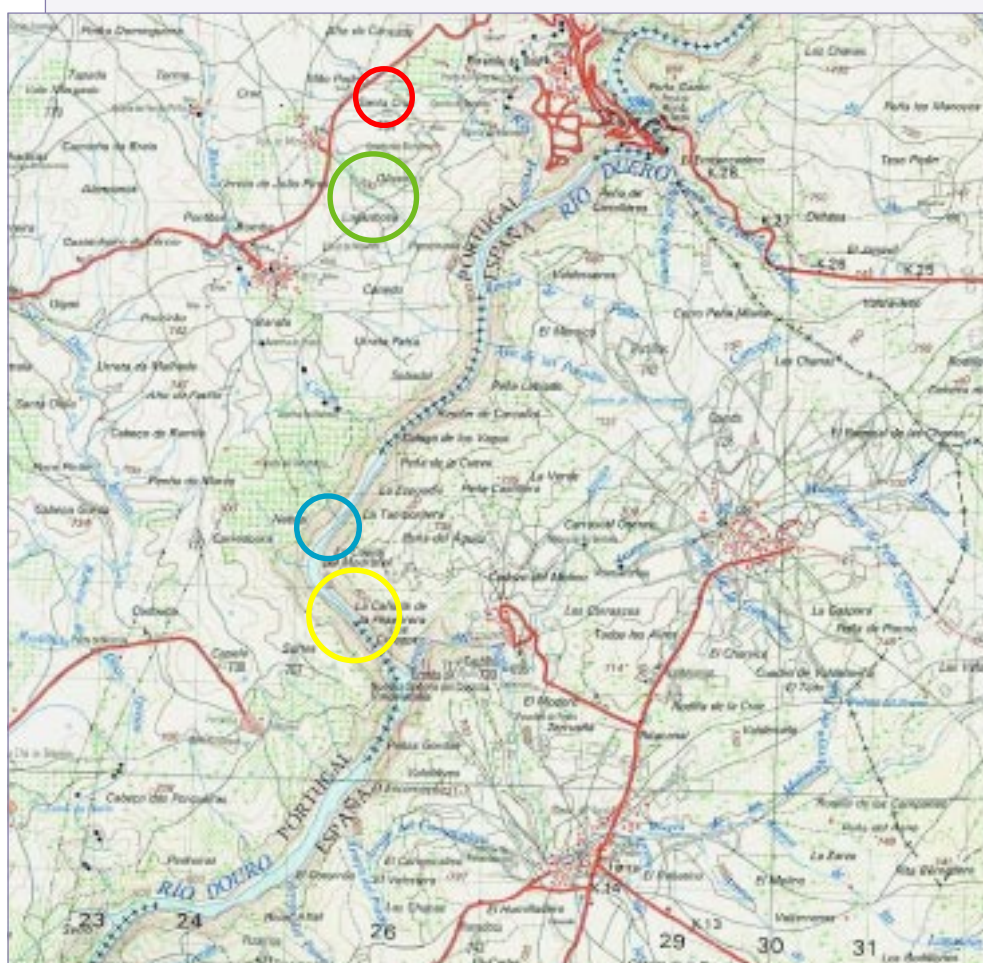
The vertical and rocky view of the canyon, with its characteristic granite forms (*domos o cabezos* and *tesos*) contrasts with an open wide landscape with spaced out margins either in the Spanish border or the Portuguese one. These areas, hidden from the cold north winds and open to the humid Atlantic air, have configured a new (mosaic) landscape, with high morphological, ecological and cultural interest, and some Mediterranean characteristics. It includes different relief, some of them dominated by natural vegetation more or less transformed due to shepherding practices, shrubs, holm oak patches (*Quercus ilex* subs. *ballota*), cork oak (*Quercus suber*), juniper (*Juniperus oxicedrus*), oak (*Quercus pyrenaica*), terebinth (*Pistacia terebinthus*), gall oak (*Quercus faginea*), madrona tree (*Arbutus unedo*) to name but some and areas dedicated to Mediterranean terracing (grapevines, olive trees and even some orange trees in the most thermal zones). This rocky, forest and agricultural environment, with high ecological connectivity, from the Duero gorges and its tributaries, is the habitat of numerous species of birds, including black stork (*Ciconia nigra*) – 10% of the Spanish population nest here – Egyptian vulture (*Neophron percnopterus*)

and eagles (*Aquila chrysaetos*, *Hieraetus fasciatus*). The territory has been organised since the 10th and 11th centuries as a system of small and concentrated villages – some of them with a clear defensive purpose, with walled fortresses, like Miranda do Douro in Portugal (an excellent viewpoint) – that make up a main, formal and functional item of the landscape. Frequently, they are situated between the *penillanura* (eroded Palaeozoic terrains) and the gorges, surrounded by orchards and little stone walled plots with prairies and hillside fields of

cereal. Dam construction and much emigration during the last 50 years have caused the abandonment of agricultural activities, the loss of cultural heritage, the dominance of shrubs and in some Portuguese areas pine reforestation. The renewed interest in local quality products (wine, olive oil and cold meats) and some public policies are allowing, in recent years, the support of agricultural and cattle raising lands and even the recovery of some abandoned terraces for vineyard and olive grove cultivation.

### LANDSCAPE PROFILE

1. Landscape typology code: MGs (Mountainous chrystaline rocks with shrub vegetation)
2. Landscape name: Deep valleys, gorges and canyons on the Spanish-Portuguese border (*Arribes del Duero-Ribeira do Douro*)
3. Landscape description:
  - Climate: Sub-humid Mediterranean, dry summers (from June to September) and high global precipitation, 90% between October and May (700–900 mm); cold winters (5.8 °C in January) but less cold than in the Meseta y Tras-os-Montes (Salamanca 3.1°C) and very hot summers (23.4 °C average temperature in July).
  - Land forms: deep contrast between the rocky walls of the gorges and the graded and rolling relief of the margins.
  - Vegetation: Trees: *Quercus ilex* ssp. *ballota*, *Q. suber*, *Q. faginea*, *Q. pyrenaica* and *Castanea sativa*. Shrubs: *Juniperus oxicedrus*, *Pistacia terebinthus*, *Arbutus unedo*, *Cistus* sp., etc.
  - Crops: cereals, grapevine, olive trees, vegetables, some orange trees and cork every 9–10 years.
  - Landscape types: mosaic of Mediterranean crops, pastures, shrubs and oak patches.
  - Protected areas: Parque Natural do Douro International in Portugal and the Parque Natural de los Arribes del Duero in Spain (declared in 2002). ZEPA because of the presence of storks (*Ciconia nigra*) in Fermoselle.
  - Land uses: Mediterranean agriculture (cereals rotating every two years with vineyard and olive grove), prairies and pastures with trees and livestock: sheep, goats, cattle and pigs. Dams for electricity; housing development only in the centres of population.



- Key:
- Strength: Agricultural and forest mosaic
  - Weakness: Problems in maintaining traditional agricultural infrastructures e.g. terracing
  - Opportunity: High landscape resources
  - Threat: Non-regularised housing development close to present-day settlements

## SWOT ANALYSIS

### STRENGTHS

Landscape heterogeneity: agricultural and forest mosaic and geomorphologic dominating areas

Spectacular geomorphologic landscapes in the gorges

Beautiful rapids and waterfalls from natural tributaries

Interesting habitats for birds. Protection of unique flora

Legal policies for natural protection on both sides of the border

Traditional rural settlements well maintained with little urban development

Great vistas

### WEAKNESSES

Loss of population and aging farmers

Low profitability in farms

Deficient communication systems

Problems in maintaining the traditional agricultural infrastructures (terracing, walls, irrigation)

Loss of river natural essence due to dam construction

High voltage electric infrastructures

### OPPORTUNITIES

High landscape resources

Public promotion of high quality agricultural and cattle raising products

Increase of rural tourism

Conservation activities related with natural parks

Local development initiatives between countries

### THREATS

Tourist development without urban planning

Non-regularised housing development close to present-day settlements

Agricultural abandonment and loss of cultural heritage

Motorboats in dams

Reforestation using exotic species (from Portuguese territory)

### REGIONAL CONTACTS

Valentín Cabero Dieguez and Ignacio Plaza Gutiérrez, Departamento de Geografía, Universidad de Salamanca (España)

Narciso Ferreira, Instituto Geológico e Mineiro de Portugal, narciso.ferreira@igm.pt

Joao Brilha, Departamento de Ciências da Terra, Universidade do Minho, Braga (Portugal)

Director del Parque Natural de los Arribes del Duero (España)  
Director del Parque Natural do Douro Internacional

### CASE STUDY III The River Ticino (Italy)

*Marco Baietto and Emilio Padoa-Schioppa, Bicocca University Milan*



Serena Vaghi

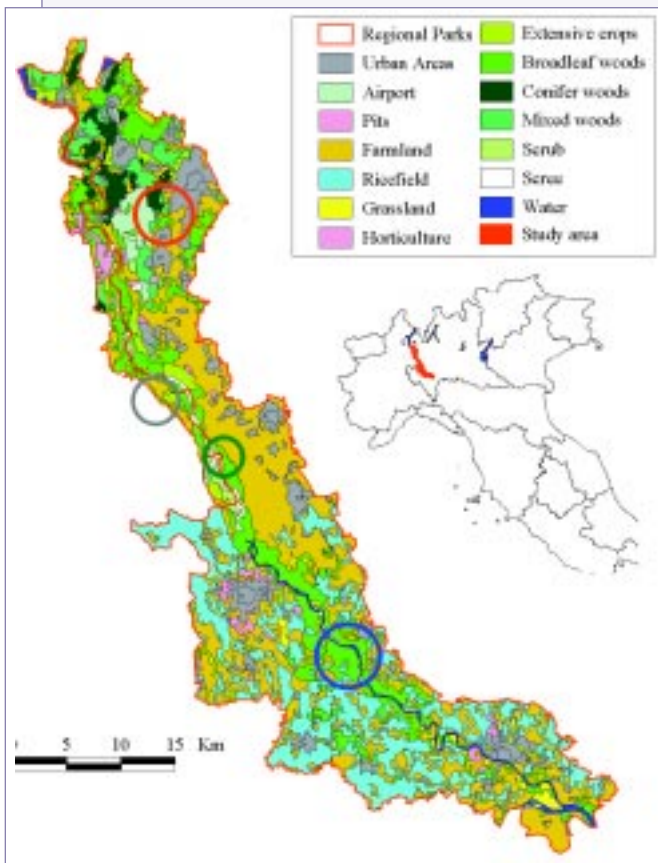
The River Ticino is the major tributary of the Po (248 km). The spring is in Switzerland, and after about 100 km the river forms Lake Maggiore. Leaving the lake, the river runs only in Italian territory and it is the boundary of two regions: Lombardy and Piedmont.

This part of the river is in a floodplain and the river has gouged its way in fluvio-glacial sediments. Since the 1970s (1974 in Lombardy, 1978 in Piedmont) the River Ticino is protected by two natural parks that together form the greater fluvial park of Europe (6,250 ha in Piedmont and 91,140 ha in Lombardy); recently UNESCO inserted Ticino Valley in MAB (Man and the Biosphere) sites. They constitute a relatively natural landscape, for many centuries man used the waters (partially altering the water regimes) and other natural resources (gravel and sand pits, woods). The river landscape of Ticino still has many fluvial forests almost non-existent in the rest of the floodplain. Indeed, this landscape is surrounded by some intensively cultivated areas and is near to the metropolitan area of Milan. The riparian forests form a continuous corridor connecting the Alps to the Apennines and forms an important route for migratory birds.



## LANDSCAPE PROFILE

1. Landscape typology code: CLf (Upland clay grounds with forest cover), LAa (Lowland alluvial grounds with arable land cover)
2. Landscape name: floodplain river landscape
3. Landscape description:
  - Climate: annual precipitation 968 mm, annual average temperature 12°C
  - Land forms: incised valley in fluvio-glacial sediments between 198 m and 56 m above sea level.
  - Vegetation/species: the area is mainly covered by forest and fields. Forests are mainly *querco-carpinion* phytosociological alliance and *carici elongatae alnetum glutinosae* (phytosociological association).
  - Crops: maize, grain, rice, poplar plantations.
  - Landscape types: river, mainly with natural banks formed by scree and woods; canals that from the river irrigate the country; forests, fields, urban areas.
  - Protected areas: regional parks are established both in Lombardy and in Piedmont.



Key:



Strength: Remnant lowland forest



Opportunity: Otter reintroduction



Weakness: Urban planning



Threat: Oil refinement

## SWOT ANALYSIS

### STRENGTHS

- Highest biodiversity level in Po Valley
- Remnant forests that connect Alps and Apennines
- Important area for recreational activities
- Projects regarding natural management/recreation/environmental education serve as demonstration projects
- Well-established monitoring in different fields (water quality, birds etc.)

### WEAKNESSES

- Uncertainty about ongoing public financing
- Different management and legislation in the two regions involved
- Conflicting land uses, still to be harmonised

### OPPORTUNITIES

- Transboundary natural river park
- Different reintroduction projects
- Monitoring of exotic species
- Sustainable agriculture
- High number of visitors in environmental tourism/education

### THREATS

- Ongoing fragmentation of the river
- Oil extraction and refinement
- Urbanisation (linear infrastructure as road and railways, airport)
- The area is affected by airborne pollutants from metropolitan Milan
- Expansion of exotic species and hunting

### REGIONAL CONTACTS

Piedmont Regional Park: <http://www.parcodelticino.pmn.it>  
Lombardy Regional Park: <http://www.parcoticino.it>

### USEFUL LINKS

[http://www.regione.lombardia.it/wps/portal/\\_s.155/603?PRLfrom=cl](http://www.regione.lombardia.it/wps/portal/_s.155/603?PRLfrom=cl)  
<http://www.regione.piemonte.it/index.htm>  
<http://www.parks.it>

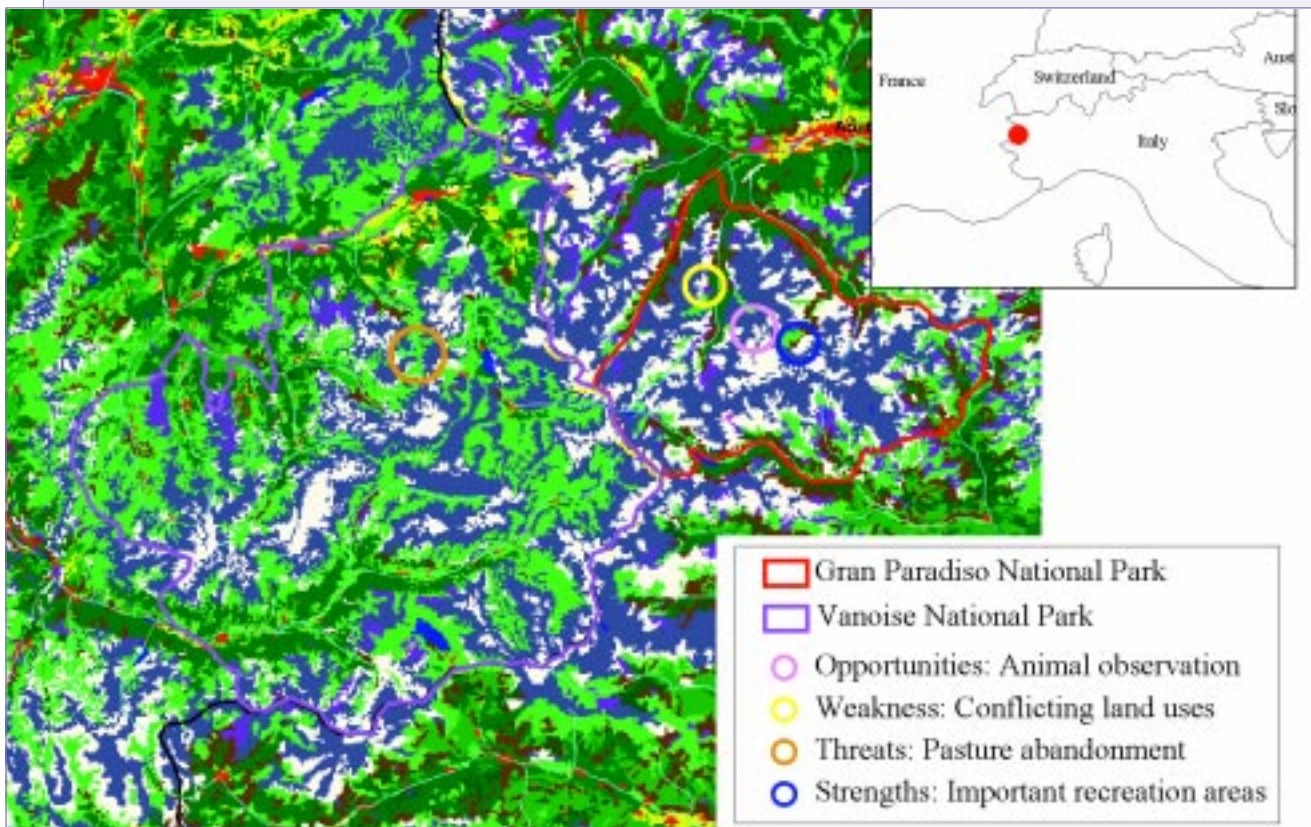
## CASE STUDY IV Gran Paradiso/Vanoise National Park (Italy/France)

**Marco Baietto and Emilio Padoa-Schioppa, Bicocca University, Milan**

It was the conservation of Alpine Ibex (*Capra ibex*) that prompted the creation of Gran Paradiso National Park, Italy, in 1922 and the Vanoise National Park, France, in 1963: they were first national parks for both Italy and France. Only about 100 Alpine Ibex remained in the Gran Paradiso Mountains, Italy, but the creation of the national parks allowed this species to increase in this part of the Alps. Another important species for this area is the bearded vulture which, by the end of the 19th century, was extinct in the Alps. Reintroduced in 1986 in Haute-Savoie, they were observed in the Vanoise and Gran Paradiso in 1989 and in 2002 new nests have been reported to appear in the Vanoise.

The Gran Paradiso National Park (703 km<sup>2</sup>) and the Vanoise National Park (547 km<sup>2</sup>) were twinned in 1972 and together they cover 1,250 km<sup>2</sup>, constituting the largest protected site in Western Europe.

The parks lie in a typical alpine landscape with mountains and valleys formed from glaciers and torrents. Cliffs, reaching up to 4,000 metres, and glaciers characterise the landscape. The flora of the parks include more than 1,000 species from different biogeographical origins. In the bottom of the valleys there are forests of Norway spruce (*Picea abies*), larch (*Larix decidua*) and the rare silver fir (*Abies alba*). Trees give way to flower-rich alpine pastures.





### LANDSCAPE PROFILE

1. Landscape typology code: HGf (High mountains chrysaline/magmatite rocks with forest cover), AGb (Alpine chrysaline/magmatite rocks with open screen), ACb (Alpine calcareous rocks with open screen)
2. Landscape name: French-Italian Alpine Landscape
3. Landscape description:
  - Climate: Cold and glacial.
  - Land forms: Siliceous Alps, between about 1,000 m and 4,061 m above sea level.
  - Vegetation/species: Transition from coniferous forests (mainly Norway spruce) to perennial snow and glacier, through larch and stone pine forests, *Vaccinium* and *Juniperus* scrub, grasslands and pastures.
  - Crops: pasture, horticulture.
  - Landscape types: Forests, scrubs, grasslands, rocks, glaciers, urban areas (villages).
  - Protected areas: Gran Paradiso and Vanoise National Park.

### SWOT ANALYSIS

#### STRENGTHS

Projects regarding natural management/recreation/ environmental education serve as demonstration project

High biodiversity

Important area for recreation activities

Established monitoring in some fields (mammals)

#### WEAKNESSES

Conflicting land uses, local population is often against the park administration (especially in Italy)

Different management and legislation in the two countries involved

#### OPPORTUNITIES

Different reintroduction projects for Bearded Vulture (in this area) and Alpine Ibex (to the whole Alps)

High number of visitors in environmental tourism/ education

Accessible animal observation

#### THREATS

Urbanisation (tourist pressure) and fragmentation (demand from local population for ski areas)

Pasture abandonment (loss of different species of this ecosystem)

Visitor disturbance to mammal populations

#### REGIONAL CONTACTS

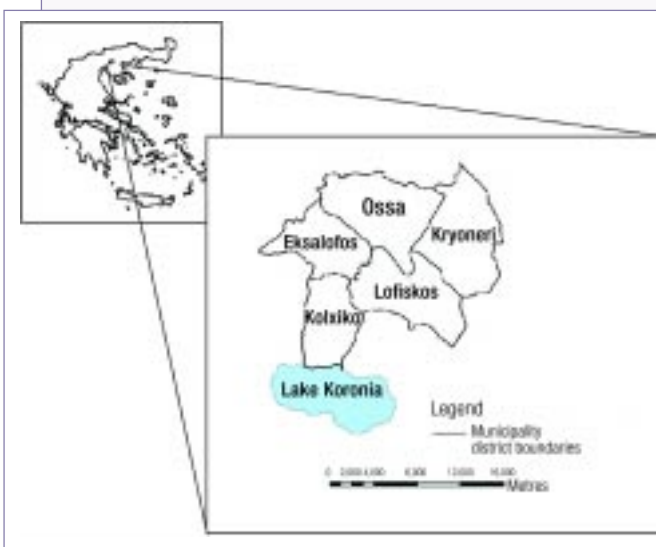
Gran Paradiso National Park: <http://www.pngp.it/eng/Index.htm>  
<http://www.parks.it/parco.nazionale.gran.paradiso/index.html>  
 Vanoise National Park: <http://www.vanoise.com>

## CASE STUDY V Lagkada County (Greece)

*Anna Sidiropoulou, Aristotle University of Thessaloniki, Greece*

The Greek landscape resulted from the interaction between man and nature and it has a long history of land-use changes. The study area is located in Lagkada County in the north of Thessaloniki Prefecture in northern Greece, covers an area of 25,520 ha (Figure 7) and is bounded by the Vertiskos Mountain (1,107 m) to the north and Koronia Lake to the south. The study area consists of a typical landscape of the north-west part of Mygdonia watershed, comprising five municipal districts

**FIGURE 7. The study area in the Lagkada County in the north of Thessaloniki Prefecture in northern Greece.**

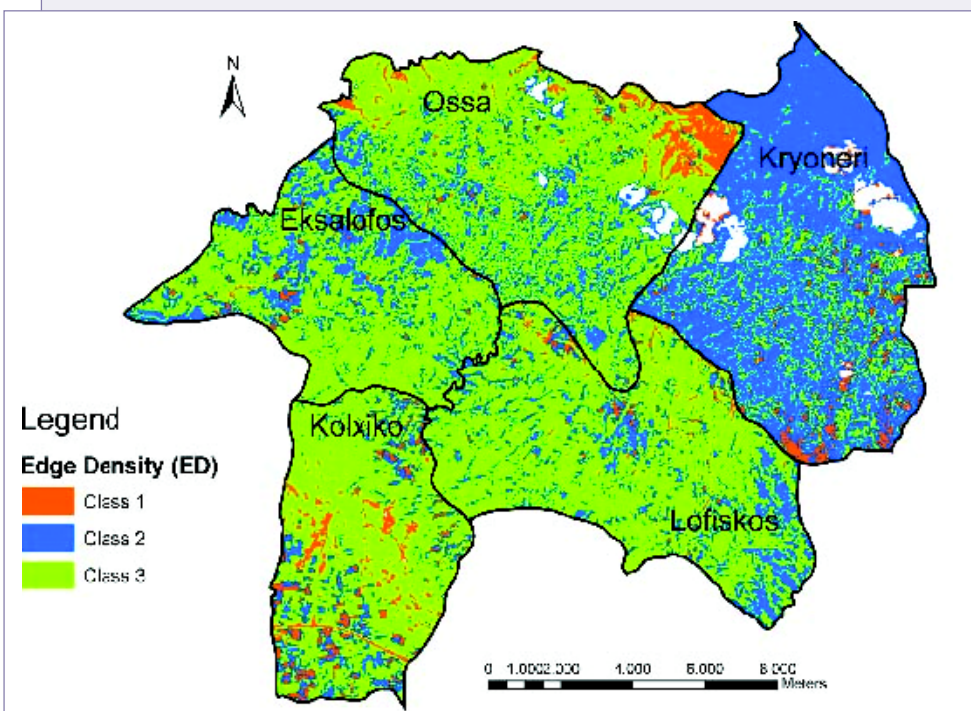


(communities) of Lagkada County. The main land uses in the area are: rangelands 14,140 ha; forests 1,820 ha; agricultural lands 7,760 ha and other land-use types 1,800 ha. It belongs to the sub-humid eco-climatic region of Greece with hard winters. In Lahana, Serres which is the nearest meteorological station (altitude 634 m), average annual temperature is 12.1°C and average annual precipitation is 585 mm. The dry period is from the middle of August until the middle of September. The area lies on a bed of metamorphic and alluvial rocks, with a small part consisting of acid volcanic rocks and tertiary depositions. It is part of the sub-Mediterranean vegetation zone *Quercetalia pubescentis* with the greatest part of the area belonging to the sub-zone *Coccifero-Carpinetum*.

An example of Transfrontier Landscapes between the municipal districts is seen in Figure 8 where the effect of different socio-economic conditions in land uses according to each community is obvious. The distribution of the patches for each class of land use identifies with the borders of the municipal districts. In particular, landscape structure of Ossa differs from landscape structure of Kryoneri, since in Ossa, there were many land-use changes, in contrast to Kryoneri where little has changed.

Landscape indicators constitute a valuable means to analyse and interpret the pattern and structure of the Lake Mygdonia landscape as it has been shaped from socio-economic pressures.

**FIGURE 8. Map with the classes for the indicator Edge Density (ED).**





## LANDSCAPE PROFILE

1. Landscape typology code: Not identified
2. Landscape name: Lagkadas Mosaic Shrublands
3. Landscape description:
  - Climate: It belongs to the sub-humid eco-climatic region of Greece with hard winters. Annual average temperature is 12.1 °C and annual average precipitation is 585 mm. The dry period is from the middle of August until the middle of September.
  - Land forms: The area lies on a bed of metamorphic and alluvial rocks, with a small part consisting of acid volcanic rocks and tertiary depositions.
  - Vegetation/species: Trees: *Quercus pubescens*, *Fagus sylvatica*. Shrubs: *Quercus coccifera*, *Rosa arvensis*, *Pyrus amygdaliformis* and varieties of grass.
  - Crops: Wheat, alfalfa, maize, tobacco
  - Landscape types: Mosaic of shrublands and grasslands interspersed with trees.
  - Protected areas: Protected wood-pasture.
  - Land uses: Rotation in understorey. Cultivation: Cereals and pastures. Pastures: Shrublands and grasslands and natural fallow. Livestock: Cattle, sheep, goats, pigs and poultry. Tree cover: Supplement to grazing (shredding, pollarding) and charcoal.

## SWOT ANALYSIS

### STRENGTHS

Heterogeneity in landscape corresponding to socio-economic changes

Protection through legislation of Lakes Koronia and Volvi

Rich cultural landscape and historical processes that influence the floristic, vegetational and ecological patterns that comprise it

Social interest for environmental issues

Proximity to urban centre

### WEAKNESSES

Deterioration of Lake Koronia in terms of water quality and quantity

Extinction of fish population in the lakes

Weak market development for specific products

Unbalanced temporal and spatial distribution of grazing animals

### OPPORTUNITIES

Strong potential multi-functionality in landscape (hunting, recreation, aesthetic and cultural values)

Potential geothermic exploitation

Increasing demand for quality food products: meat, milk products, honey

### THREATS

Intensification of agronomic practices – water-fed cultivations

Bird population decline

Intensification: no natural regeneration, increased erosion

Extensification and abandonment: shrub encroachment and tree decline, fire risks

Village abandonment

### REGIONAL CONTACTS

Lagkada County, eplagada@nath.gr  
Lagkada Municipality lagadas@otenet.gr  
Ioannis Ispikoudis, Laboratory of Rangeland Ecology (286) Aristotle University 54124 Thessaloniki, Greece ispi@for.auth.gr  
Anna Sidiropoulou, Laboratory of Rangeland Ecology (286) Aristotle University 54124 Thessaloniki, Greece sidiropoulou\_@hotmail.com

### USEFUL LINKS

<http://www.georange.org>  
<http://www.minenv.gr/5/55/e5500.html>  
<http://www.auth.gr/forestry/>  
<http://www.minagric.gr/en/index.html>  
[http://www.nath.gr/lagadas/index\\_en.htm](http://www.nath.gr/lagadas/index_en.htm)  
<http://www.auth.gr/index.en.php3>  
<http://users.auth.gr/~vpapan/indexen.html>  
<http://www.cordis.lu/improving/fellowships/home.htm>

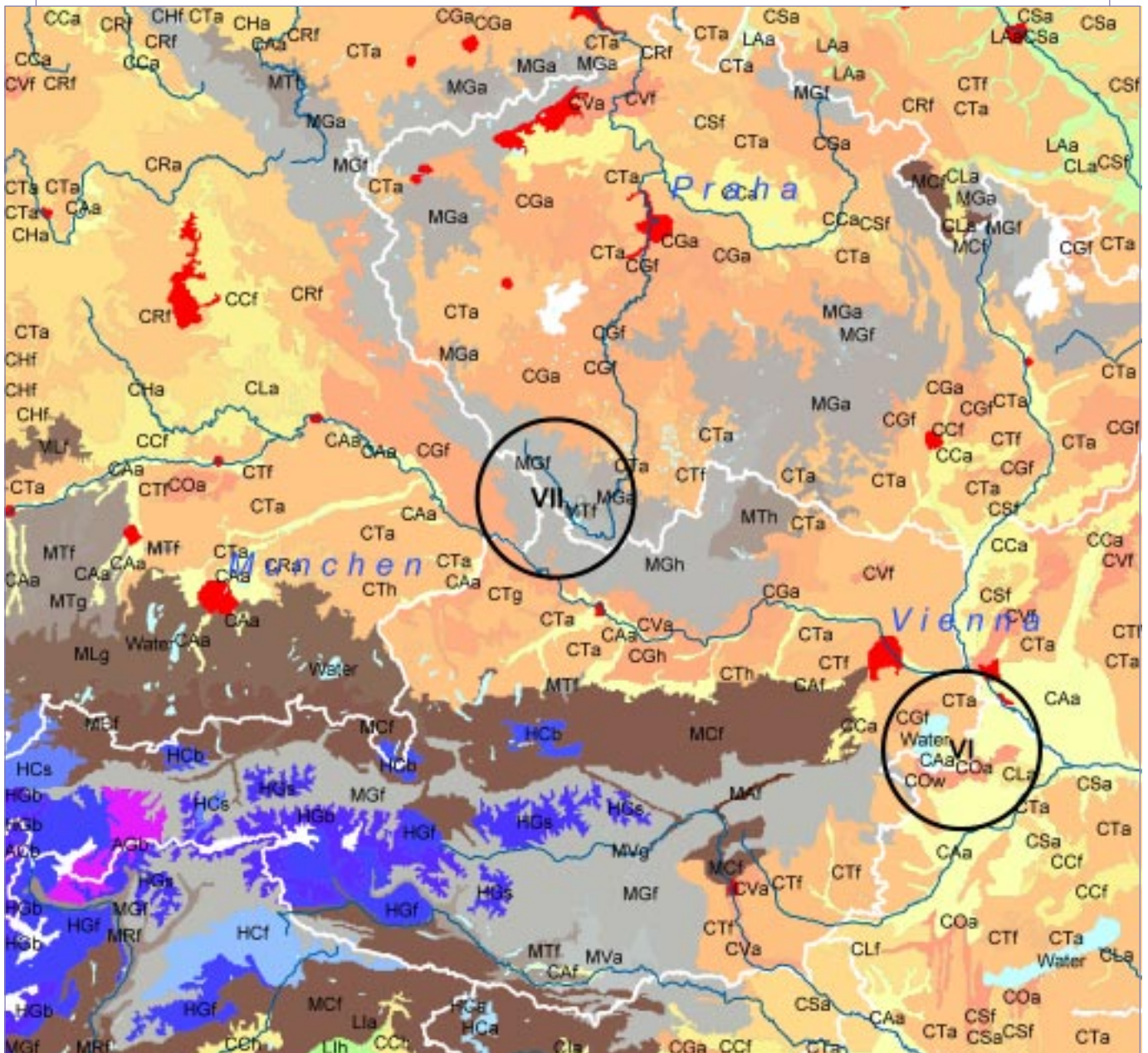
## 4.2 Continental Landscapes

This region represents the temperate zone of Europe between the 43–55°N latitude and 12–40°E longitude, with highly variable landscape and climate of transitional character. The main constituent geographical landscape units are the Brandenburg heathlands, the Polish Lowland, the East European Lowland, the Bohemian and Moravian Basins surrounded by mountain massifs, the Carpathian Mountain Range System with the Carpathian Basin, the Romanian Lowland and the Northern Coastal Region of the Black Sea.

The geomorphology of the territory shows considerable variability with changing altitudes from 0 to 2,655 m above sea level (Tatry). Most of the major rivers such as the Danube, Dnieper, Tisza, Dniester, Vah, Olt and Mures belong to the Black Sea catchment region, while

the Vistula and Odra to the Eastern Sea and the Elbe with the Vltava to the Northern Sea catchment area. Central Europe is situated in the cool temperate zone, but the climate is greatly variable and changeable due to the mixing of the Atlantic, continental and sub-Mediterranean influences. Increasing continentality towards the east can be detected. The zonal biomes are temperate deciduous forests, temperate deciduous-conifer mixed forests, forest-steppe and steppe. In the mountain ranges beech forests, beech-conifer mixed forests, sub-alpine and alpine vegetation predominate, while the rivers are usually bordered by alluvial gallery forests, swamps and meadows. The main groups of the characteristic soils are the podzols, brown and grey forests soils, chernozhiems and the intrazonal hydromorphic and lithomorphic types. The proportion of agricultural lands can reach 70–80% of the territories of the countries.

**FIGURE 9. Transfrontier Case Study sites at (VI) Fertő/Neusiedler Lake and (VII) Šumava Mountains/Boehmerwald/Bayerischer Wald at the Austrian, German, Hungarian and Czech borders.**



The main environmental threats are eutrophication and acidification due to air and water pollution; toxicity; land use changes, climate change and as a consequence loss of biodiversity.

Directly after the political changes in 1989, the 'Black Triangle' was considered the symbol of Central Europe's environmental degradation. Emissions from coal burning power plants and related industries concentrated in the border area between the Czech Republic, Poland and Germany were responsible for cutting life expectancies, eroding cultural monuments, and turning hilltop forests into a gnarled mass of stumps. Since then massive investments made by the three countries, as well as EU programmes in cleaner energy and technology, have led to significant improvements, including cuts in emissions of sulphur dioxide of 91% and in emissions of solid particles of 96%.

Contrary to common perceptions, the greater proportion of Europe's natural heritage today lies in the Continental and not the Atlantic part of the continent. In comparison with Western European countries, where economic development took off with the Industrial Revolution, the slower pace of change that occurred in Central and Eastern Europe served to better preserve the natural features of the region. The relatively large number of plant and animal species reflects the region's location adjoining several of the great Eurasian biogeographic zones.

During the Pleistocene Epoch (from about 1,600,000 to 10,000 years ago) life in the region was not destroyed by advancing glaciers as occurred in much of Europe but was actually enriched by the immigration of species from the north, some of which still survive. Influences from the steppes of western Asia also penetrated the region at that time. Nonetheless, the greater part of the plant and animal life is central European, mixed with a type that blends Arctic and Alpine characteristics in the high mountains. Steppe species are most characteristic in the north-east and south-east, while the south is rich in sub-Mediterranean and Mediterranean species. In Eastern Europe, almost half the land area is still covered by forests – and, with about a further 20% covered by natural grasslands, about 70% of the total land can be regarded as non-domesticated. However, over the century almost 10% of this area has been converted into crops or pasture. Under former communist regimes, agriculture was dominated by large-scale collective farming for much of the last century. Although heavily

subsidised, collective agriculture but was unable to provide adequate supplies of food. Nevertheless, per capita food production of Eastern European countries was higher than in the former Soviet Union but the impact of heavy machinery and the widespread use of chemicals and fertilisers contributed to the degradation of soil structure, soil erosion and acidification. By the mid-1980s in Hungary, for example, about 50% of farmland was affected by acidification and 17% by severe soil erosion. Climatic variations led to large fluctuations in yields. Poor facilities for food storage and distribution led to large losses. Many attempts to extend the area under cultivation caused extensive ecological destruction. Since 1990, land abandonment has become a major problem in the preservation of Continental landscapes, especially on marginal land where many areas, small and large, are no longer in use (UNEP 2000).

### **Continental case studies in the context of European landscape units**

The three examples of continental landscapes cover the transfrontier areas between Hungary and Austria (Fertő/Neusiedler See), the three-country region between Czech Republic, Germany and Austria, and the Polish-Belarusian border at Bielaviezhszkaya Pushcha.

The sixth Case Study, the water body of the Fertő/Neusiedler Lake, looks at the border region between Austria and Hungary. It is interesting to see that in the larger regional context, the national borderline is actually following natural divisions such as the arable soft loamy hills (CTa) on the Austrian side and the higher alluvial plains (CAa) of the Danube dominating the Hungarian region. Around the lake lowland, the actual case study zone, we find landscape units dominated by organic materials with wetlands (COw) and arable land use (COa).

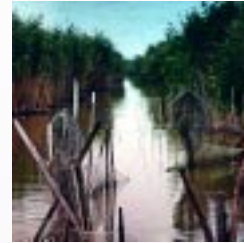
Case Study VII, encompasses the Šumava Mountains, Bohemian Forest and Bayerischer Wald which are mainly located in forested mountainous landscape units with crystalline rocks/magmatites (MTf) and loamy parent materials (MGf). It is interesting to see that most of Czech Republic's borders with Germany, Poland and western Austria are following forested mountain ridges, though arable and heterogeneous agricultural land use are quite common.

Case Study VIII is concerned with the Polish-Belarusian border outside the current landscape map and cannot be classified at this time.

## CASE STUDY VI Fertő/Neusiedler Lake Landscape (Hungary/Austria)

Éva Konkolyiné, University of Western Hungary, Hungary

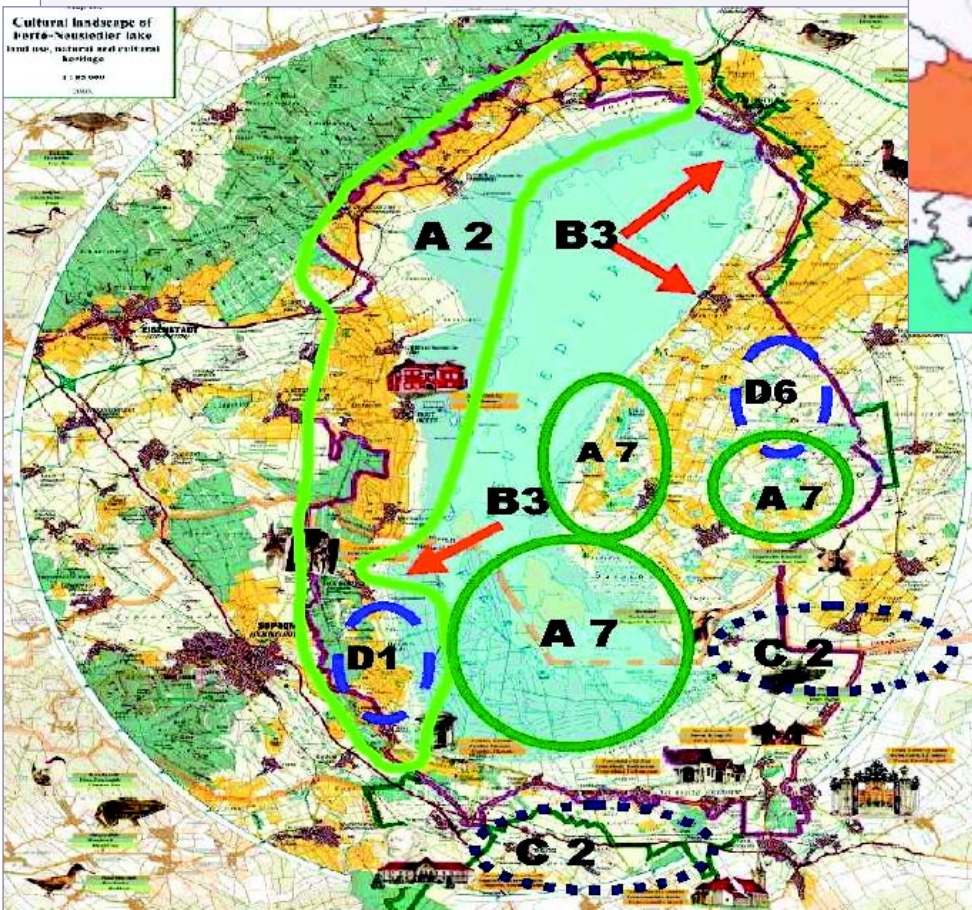
Thomas Wrbka, Institute of Ecology and Conservation Biology, Austria



The Fertő-Neusiedler Lake landscape lying on the Austro-Hungarian border region in Central Europe became transfrontier in 1918 after WWI, when the new political division drew a new border through the lake dividing the basin into two parts. The Hungarian southern part of it is lowland with a hill range on the western side. The northern Austrian section consists of two contrasting landscape types. In the west there is a pronounced slope zone of a low mountain ridge, the so-called 'Leitha-mountain'. This landscape is characteristic in the country where the plains and low mountains dominate. It is unique in that it lies within semi-natural areas and traditional land management

systems. The land use is characterised by the diversity of agriculture and horticulture, as well as viticulture, tourism and recreation. The considerable biodiversity of the Hungarian area near the border, is the consequence of the restrained development during the communist period (1948–1989) and the environmentally-friendly landscape management after the foundation of the national park. Socio-economic perspectives are increasingly related to tourism. There is a wide range of opportunities for recreation and tourism – open and thermal water-related activities, eco- hunting- and rural tourism as well as activities such as cycling and the arts and culture.

Photos: Györfy Kárpál and Dr. Éva Konkoly György



Key:

-  Strengths: High biodiversity (A2) and well-organised nature protection (A7).
-  Weakness: Some tourist facilities are concentrated on mass tourism (B3).
-  Opportunities: Using agro-environmental subsidies for small-scale agriculture (C2).
-  Threats: Suburbanisation (D1) and increased water consumption (D6).

Map edited by the Paulus Cartographical Atelier in Hungary, 1991, published in the Documentation of World Heritage Fertő-Neusiedler Lake on CD. Compiled by Bundesdenkmalamt Vienna and VÁTI Kht. Budapest. Budapest-Vienna 2002.

## LANDSCAPE PROFILE

1. Landscape typology code: CTa (Upland loamy grounds with arable land cover), CAa (Upland alluvial plains with arable land cover), COw (Upland organic materials with wetland cover), COa (Upland organic materials with arable land use)
2. Landscape name: Fertő-Neusiedler Lake
3. Landscape description (short):
  - Climate: continental
  - Land forms: mainly lowland encircled with low hills (100–300 m above sea level)
  - Vegetation/species: original potential vegetation: *Carici-alongatae alnetum*, *Orno-Quercetum pubescenti cerris*, *Ceraso-fruticosae-Crataegetum*, *Caricetum-humilis* and *Festucetum sulcatae*. Typical and protected species: *Adonis vernalis*, *Carex pilosa*, *Primula farinosa* and *Gentiana austriaca*
  - Crops: wheat, maize, wine, fruits, vegetables
  - Landscape types: shallow alkali lake with large reed belt, encircled with cultivated lowland and alkali steppes, along with hills covered by vineyards and partly with forests. Settlements are rural, situated around the lake.
  - Protected areas (nationally and internationally): Fertő-Hanság National Park. UNESCO World-Heritage as cultural landscape.
  - Land uses: agriculture, tourism, rural settlements, nature and landscape protection

## REGIONAL CONTACTS

Fertő-Hanság National Park,  
H-9435 Sarród, Rév-Kócsagvár Pf. 4.  
Tel: (+36 99) 537-620, (+36 99) 537622  
Fax: (+36 99) 537-621  
E-mail: fehnp@ktm.x400gw.itb.hu  
West-Pannon Development  
Agency, H-9400 Sopron,  
Templom u. 4.  
Tel: 99-512-910  
Fax: 99-510-150  
E-mail: westpa94@matavnet.hu;  
www.westpa.bdtf.hu

## USEFUL LINKS

<http://www.na-tura.hu/helyszinek/ferto/fertonp.htm>  
<http://www.ktm.hu/hatter/fhnp.htm>  
[www.naturschutz.at](http://www.naturschutz.at)  
[www.tourist-net.co.at/natps\\_1.htm](http://www.tourist-net.co.at/natps_1.htm)  
[www.nationalpark-neusiedlersee.org/htm/index1.htm](http://www.nationalpark-neusiedlersee.org/htm/index1.htm)

## SWOT ANALYSIS

### STRENGTHS

Diverse natural characteristics despite the slight geomorphological variety in the SE part

Eco-zone between mountain ridges and lowland alkaline lake basins produces high biodiversity in the western part

Highly attractive due to harmonious transition between mountains and Lake Basin in western part

The most western alkali lakes in Europe

Several thermal wells and bathing in the south-west

Two famous Baroque castles in Hungary

Well-organised nature protection with several large-scale protected areas (National Park – recognised by IUCN, RAMSAR-site, UNESCO World Heritage – Cultural landscape)

Cultural heritage well-preserved in the west

Recently more attention in the southern part as well

Broad range of tourist activities with a good balance between health/cultural/rural/eco-tourism and intensive tourism

Diverse land use, large variety of land-cover types

Reed wetland vegetation with highly specialised species as well as traditional land use practises

One of the most important bird refuges

### WEAKNESSES

Insufficient communication within and between the countries

Landscape protection (weak) and nature conservation (strong in parts) not balanced

Some tourist facilities are concentrated on mass-tourism and endangering nature and cultural values

Low professional base, many young people find jobs in nearby cities – high commuter rate, as a consequence, thus rural settlements are partly transformed into ‘sleeping’ villages

### OPPORTUNITIES

World Heritage diploma is an opportunity to strengthen co-operation and raise local identity

More openness in the society and more communication between Austria and Hungary

More co-operation and joint development of protection strategies after the accession of Hungary to the EU

Growing need for highly developed tourism with a broad range of services and attractions

Growing regional identity of Hungarian population

Possibility of using agro-environmental subsidies for extensive cultures, maintenance or restoration of small-scale agriculture

### THREATS

Hungary: growing number of second residences in villages and vineyards; change of vineyards into gardens

Transformation of vineyards into residential areas promoted by zoning, especially villages around Sopron

Suburbanisation caused by the increase of residential and industrial areas in and around villages in Austria

Air and noise pollution caused by increase in freight and tourism traffic in the south-west

As the water level of Lake Fertő was stabilised on a comparatively low level, water dynamics deteriorated

Recent increase in water consumption for irrigation and households has lowered the ground water level; the small lakes are at risk of drying up

A range of ecological problems – loss of semi-natural habitats and landscape openness, pollution of water bodies by agro-chemicals in Seewinkel and Hanság caused by more intensive agriculture (vineyards and vegetables)

Poorly developed architectural heritage-protection in the villages, loss of traditions – especially in the east

CASE STUDY VII Šumava Mountains/Boehmerwald/Bayerischer Wald  
(Czech Republic/Austria/Germany)

*Zdenek Lipsky, Czech Agricultural University/CAU, Czech Republic*



This trilateral transboundary landscape in the continental part of Europe is located on both sides of the main European watershed between the Rivers Elbe and Donau, on boundaries between The Czech Republic, Germany (Bavaria) and Austria. It is the largest forest complex (ca 2,000 km<sup>2</sup>) in Central Europe with dominant spruce cover. Typical hercynian relief of low mountains (the Bohemian Massif) is slightly undulated with elevations up to 1,000 m above sea level. The Grosser Arber (1,456 m) on the Bavarian side is the highest peak, reaching up to the climatic forest limit. Large spruce monocultures are typical and prevail for the most of the territory, especially on the Czech side. Mountain peat-bogs with dwarf pine and eight glacial lakes with alpine and boreal elements of biota are among other characteristic features of the natural landscape. Mountain plains typical for altitudes of 1,000–1,200 m are partly deforested and covered by semi-natural grasslands as remnants of former agricultural and pastoral use. These non-forest areas have increased biodiversity and have become an attraction for visitors. The main mountain ridge forms a watershed and has been the historical boundary of the Czechia (Czech Kingdom) for 1,000 years. The continuous historical development of the region on both sides of the state boundary, and traditional crossing of the boundary for local people from both nations came to a dramatic end after WWII. Germans were transferred out of the Czech area, while the Iron Curtain closed the boundary and divided the mountains into two separate parts which developed along different economic, social and cultural lines for next 40 years. The border was reopened after

the Czech 'Velvet Revolution' in 1989. Due to the unique natural and landscape qualities, two national parks were established in the region: the Bavarian Forest National Park (131 km<sup>2</sup>) in Germany and the Šumava National Park (683 km<sup>2</sup>) in the Czech Republic. However, conflicts and misunderstandings now arise from the different methods of park management and nature conservation practised in the Czech, German and Austrian parts of the mountains. For example, opinions differ concerning the cutting of trees affected by bark-beetle in the forest zone of the national parks. Now that the mountains are open for tourism, local authorities in the region would like an extensive development of recreational facilities such as hotels, pistes and ski lifts, but such tourist development plans may be in conflict with nature conservation aims.

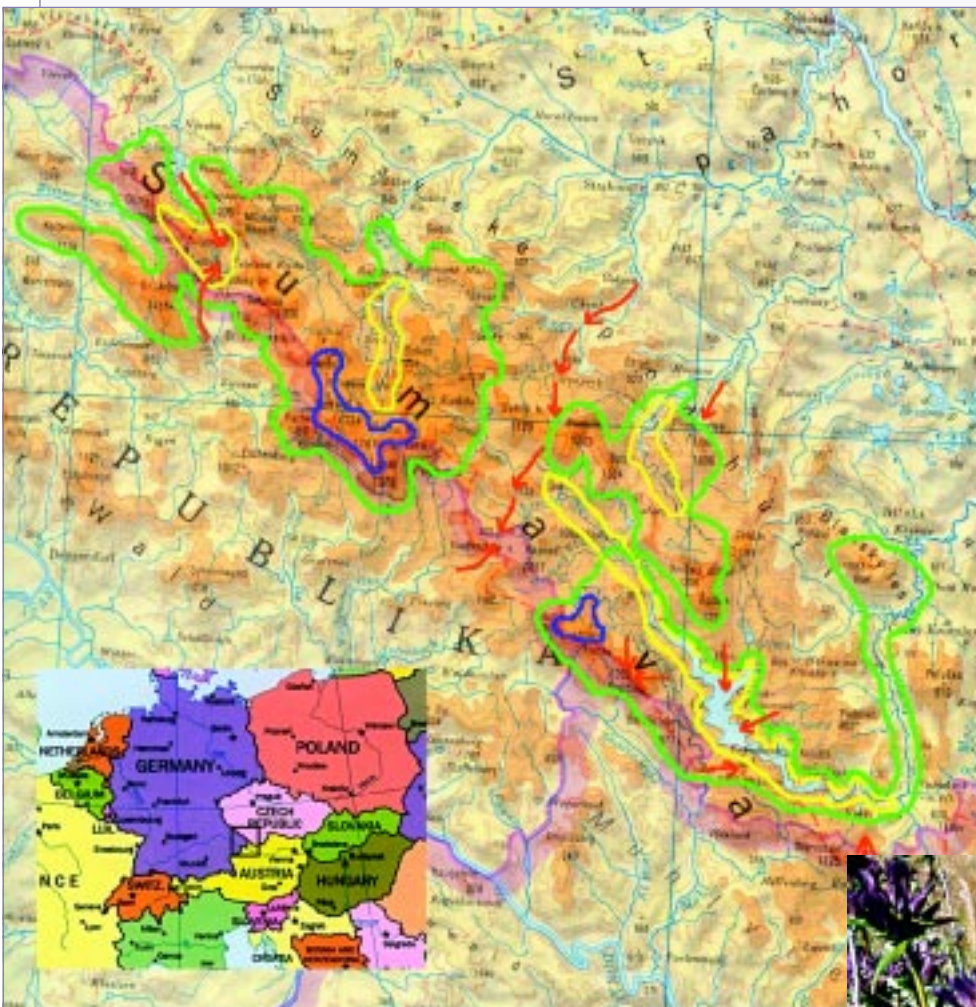
In comparison to other landscapes in the Czech Republic it is a sparsely populated area containing the highest proportion of forests, the largest forest area in the country (and, indeed, in the whole of Central Europe) and also the largest area over 1,000 m above sea level.

Socio-economic perspectives: agro-forestry (extensive), recreation (eco-friendly), rural tourism and outdoor sports, cultural identity (on the Czech side) severely damaged in the mid-20th century.


Historical aspects: this area, historically inhabited by two nations, Czechs and Germans, is now sharply divided by the state boundary. Typical traditions include local rural products, agriculture, forest and wood-carving industry, glass manufacturing and folk music.


## LANDSCAPE PROFILE

1. Landscape typology code: MTf (Mountainous soft loamy rocks with forest cover), MGf (Mountainous chrystaline/magmatite grounds with forest cover).
2. Landscape name: Šumava/Boehmerwald/Bayerischer Wald.
3. Landscape description:
  - Climate: Cold in the mountains, transitional between oceanic and continental, mean annual temperature from 4°C to 7°C (depending on the altitude), mean annual precipitation between 700–1,400 mm (depending on the altitude and position), snow cover lies for 60–120 days and reaches up 30–200 cm maximum height (depending on the altitude).
  - Land forms: Low mountains with gentle slopes and mountain plains, altitude 600–1,400 m a.s.l.
  - Vegetation: Spruce forests, remnants of former mixed beech forests, mountain peat-bogs, mountains semi-natural grasslands.
  - Crops: Grasslands, potatoes, cereals (not intensive).
  - Landscape types: Low (Hercynian) mountains, forest landscape, semi-bocage
  - Protected areas: National Park Šumava Mts (683 km<sup>2</sup>), National Park Bayerischer Wald (Bavarian Forest – 131 km<sup>2</sup>), Landscape Protected Area Šumava (980 km<sup>2</sup>) as a buffer zone of the Šumava Mts NP, Šumava Biosphere Reserve, many small-scale nature reserves and monuments.




Key:

 Strengths: an attractive, natural and unique area with remnants of wilderness, virgin forests, peat bogs and glacial lakes, deep erosion valleys of the rivers Vltava and Vydra: great potential for nature conservation education and eco-tourism.

 Weaknesses: unhealthy spruce monocultures; dead forests; heavy machinery used in forestry in protected areas.

 Opportunities: potential to develop eco-tourism and recreation; summer and winter sports; and to attract foreign tourists.

 Threats: plans to construct new sports facilities, ski lifts and large hotels in protected zones; pressure of local authorities to develop these activities within the national park or to reduce the territory of the national park; heavy traffic.



## SWOT ANALYSIS

### STRENGTHS

Unique low mountain area in Central Europe with the largest forest complex in Central Europe

Two national parks (on both sides of the state boundary) and biosphere reserve

The area is well studied, much biological, geographical and environmental data is available and current research projects and studies are concentrated in this area

Mostly healthy environmental conditions, good air and water quality

Sparsely populated area, especially on the Czech side

Great potential for eco-tourism and recreation and for environmental education of people (agro-tourism, riding, mountain-biking, skiing)

Environmental and ecological education is organised in both national parks

Landscape is an attraction for people from more densely populated parts of Western Europe (such as The Netherlands)

### WEAKNESSES

Difference of opinion concerning landscape management in national parks in Germany and in the Czech Republic and insufficient international co-operation

Unhealthy conditions of spruce monocultures in some parts of the mountains, especially on the main ridge in the first protected zones of the Šumava NP in altitudes 1,100–1,370 m a.s.l.

Pressures of local authorities (on the Czech side) to develop intensive tourism and recreation, which is not in the interests of national park management; state environmental and nature protection policy is not harmonised with sectoral policies in agriculture, forestry and local development

Cultural identity was damaged on the Czech side after WWII and is still lacking (the Czech part was inhabited by new people without roots in the region)

Few job opportunities so people tend to leave the countryside for the city

Abandoning agricultural lands due to marginalisation brings a danger of decreasing biodiversity and scenic landscape qualities

### OPPORTUNITIES

To protect the largest forest complex in Central Europe and increase its ecological stability by improving species composition and health conditions of the forest stands

Potential to develop eco-tourism and not destructive forms of rural and environmental tourism and recreation

Development of transboundary collaboration on joint projects, environmental education and development plans for the whole region

To attract foreign visitors for holidays and to learn about nature conservation

### THREATS

Marginalisation, abandonment of agricultural lands and decrease in landscape diversity, aesthetic qualities and scenic views, possible change in landscape character

Pressures of local authorities to reduce the area of the national park (on the Czech side)

Uncontrolled development and construction of new sport facilities, ski-lifts and large hotel capacities

Cutting old forest stands due to economic reasons for export of rough woods

### REGIONAL CONTACT

Sprava NP Šumava (Administration of the National Park), 1.maje  
260, 385 05 Vimperk, Czech Republic  
Tel: +420 339 450 111  
E-mail: vimperk@npsumava.cz

### USEFUL LINKS

[www.npsumava.cz](http://www.npsumava.cz)



## CASE STUDY VIII Bielaviezhskaya Pushcha/Puszcza Białowiecka (Belarus/Poland)

**Galina I. Martsinkevitch, Anton Shkaruba and Maria Falaleeva, Belarusian State University, Department of Geography, Belarus**



Photo: Andrzej Kaczkowski (<http://www.dpn.com.pl>), inset: illustration to The Song of Byson M. Husowski (<http://www.art-mission.com/gallery>) by Erena Koorners.

Bielaviezhskaya Pushcha (in Belarusian the word 'pushcha' refers to a large forest) is situated in Belarus and Poland (87,600 and 10,500 ha respectively). As Pushcha has been under strict protection since 1541, it remains for the most part a large, intact, forest landscape, thus giving an idea of what Central and Western Europe used to look like. About half of the forest has remained undisturbed for more than 100 years; some fir woods are around 120–160 years old, pine forests 180–200 years old and oak forests 180–220 years old; many pine trees have been calculated as being 350 years old and oaks between 400–600 years old. Broadleaved forest covers the larger part of Bielaviezhskaya Pushcha. It is comprised of oaks and hornbeams marginally mixed with firs and pine trees. Coniferous forest is less common, mainly composed of fir trees often mixed with hornbeams and oaks. There are over 4,500 species, 44 of which are recorded in the Belarusian register as endangered. The Pushcha's fauna consists of 11,559 species, including the rare and protected European Bison.

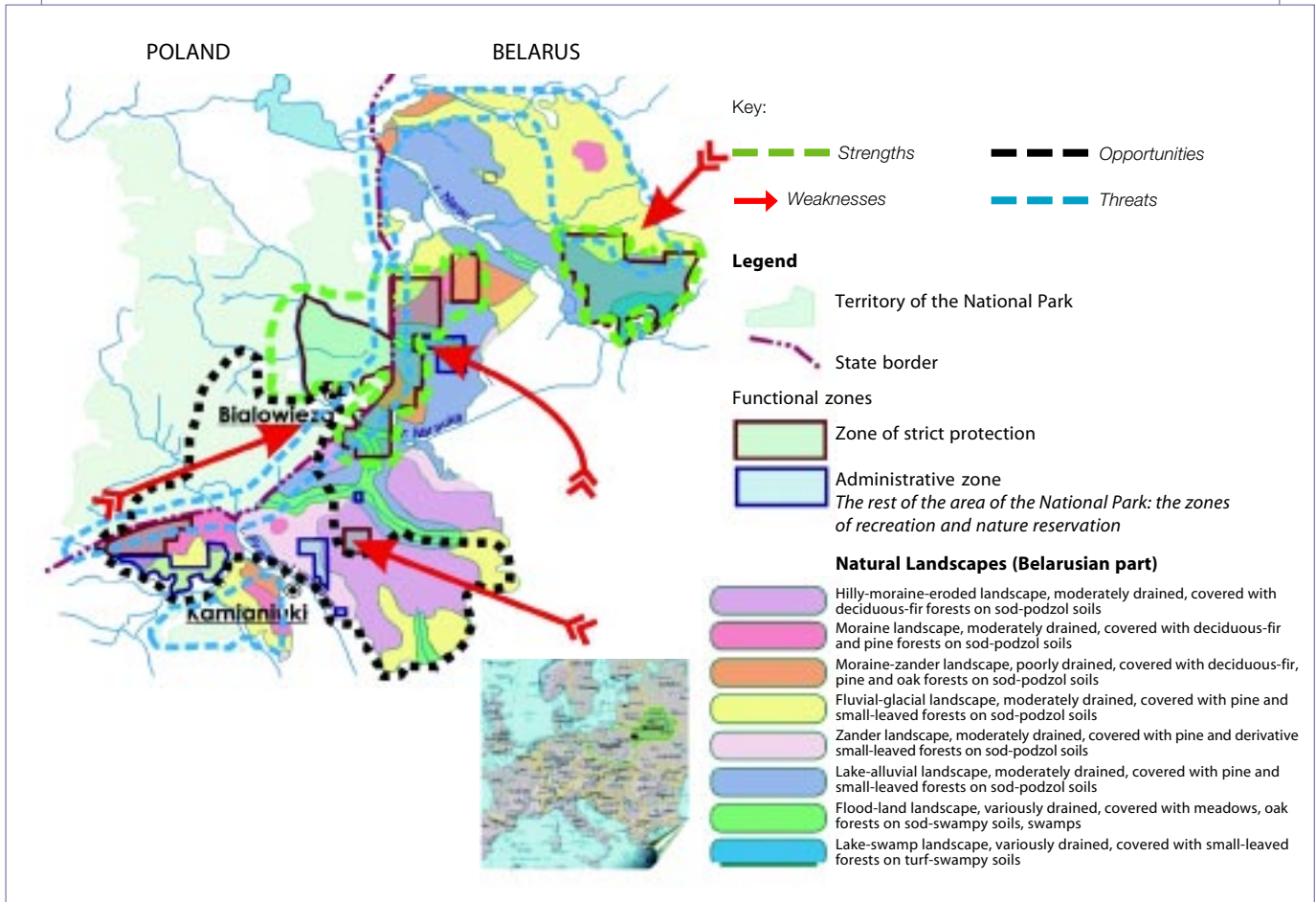
The Pushcha's landscapes of undulating moraine relief, with deciduous forests composed of oaks and hornbeams, are unique for Belarus. In Poland such land forms and vegetation are more common, although the Pushcha is exceptional in its biodiversity and relatively intact state.

In the past, Pushcha has been used both as a refuge and a strategic food supply, especially for military purposes. In 1490 200 barrels of bison meat was prepared for Prince Yagaila. During WWI and WWII the area was subject to large scale timber harvesting. Since medieval times it has been the hunting place of princes,

kings, tsars, Communist Party bosses and presidents. These activities have dramatically affected Pushcha's biodiversity and caused significant reduction in area. To preserve the unique landscape, national parks have been established in Belarusian (formerly Soviet) and Polish sections of the forest. During Soviet rule the Belarusian sector was used as a location for missiles, since the area was already under strict protection, and it now benefits from a good road network. Now Pushcha serves as a tourist area with recreational activities mainly focused on hunting for deer and wild boar. The restricted areas are home to many important scientific and conservation projects. In Poland the focus is on environmental tourism and education. On the whole, the major environmental problem is large-scale deforestation which still takes place in the Belarusian sector and provokes public protest (unusual for Belarusian society).



<http://p21.org.by>



### LANDSCAPE PROFILE

1. Landscape typology code: Not identified
2. Landscape name: Bielaviezhszkaya Pushcha (Belarusian), Puszcza Białowieńska (Polish).
3. Landscape description:
  - Climate: mean annual temperature 5–8°C;
    - mean temperature of cold period (November–April) -2°C, January (the coldest month) -5°C;
    - mean temperature of warm period (November–April) 13.5°C, July (the warmest month) 18°C;
    - mean annual humidity 65–75%; mean precipitation 600–655 mm.
  - Land forms: The Pushcha area is a flat (in the central part flat to undulating) plain underlain by sandy Riss moraine, limned, alluvial and fluvio-glacial sand (respectively 32.6, 24.6 and 10.2% of the Belarusian sector), which are quite common for Belarus and Poland. The central part of the landscape has a land form of low hills, uncommon for Belarus, (from 3–5 to 10–15 m) with flat tops underlain by sandy and loamy Riss moraine (3.8%).
  - Vegetation/Species: the area is mainly covered by deciduous forest, remaining relatively intact since medieval times. The diversity of the Pushcha's higher vegetation is as follows: *Caryophyllaceae*: 43 species, *Compositae*: 108, *Cruciferae*: 40, *Cyperaceae*: 66, *Graminae*: 85, *Labiatae*: 41, *Orchidaceae*: 24, *Papilionaceae*: 54, *Polygonaceae*: 24, *Ranunculaceae*: 35, *Rosaceae*: 59, *Scrophulariaceae*: 41, *Umbelifereae*: 32.
  - Crops: since the area is under protection, it is not commonly used for agricultural activities, except cultivating fodder plants to feed herbivorous animals during winter and vegetables for workers. However, several villages are situated within the Pushcha's outskirts; therefore small patches of grain-crops (rye, barley) and potato are widespread at margin areas.
  - Landscape types: flat to undulating plains with loamy and sandy soils, and gentle slopes and low hills of sandy to loamy moraine covered with deciduous and some mixed forests.
  - Protected areas: national parks are established within both the Belarusian and Polish sectors; in 1977 the Polish sector gained World Heritage recognition from UNESCO and the Belarusian sector in 1992.
  - Land uses: the Belarusian sector is divided into zones of strict protection (only maintenance felling allowed), recreational and administrative zones; while the Polish sector is divided into zones of strict protection and recreation.

## SWOT ANALYSIS

### STRENGTHS

The area features unique, relatively intact landscapes and high land form and biodiversity

One of the areas less contaminated by Chernobyl radio nuclides compared to the rest of Belarus

The area is well studied, especially by biologists; organised environmental education in Polish sector

Has a national and international reputation for unique landscape, enhanced by the World Heritage designation

The Polish sector has good access by public transport, supporting environmental tourism

Little recreational pressure on ecosystems within the recreational zone in Belarusian sector

The Polish sector is well organised with separate areas and facilities for scientists and tourists

### WEAKNESSES

Insufficient level of co-operation between Belarusian and Polish National Parks

Narrow focus of ongoing research projects: focus on biology, not air pollution or landscape studies

In Belarus little attention is paid to environmental education and development of recreational facilities

Pushcha is in a frontier zone, many areas are closed to study and visits, especially international projects

Little public transport (mainly used by hunters) to the Belarusian sector

### OPPORTUNITIES

Growing number of visitors to the recreational zone of the Polish sector for eco-tourism/education

Growing co-operation between Polish and Belarusian sectors, opportunity to broaden contacts after Poland's access to the EU

Great potential for developing environmental tourism in Belarusia: good facilities, landscapes in the recreational zone are relatively intact



### THREATS

Land-use conflicts in Belarus: since the recreational zone is under very strict protection, local population has insufficient access to public services

In the Belarus sector there are no jobs for the local population, as agriculture is restricted and the existing modest tourist facilities do not need many employees

The area might be affected by airborne pollutants from Poland and Western Europe

Deforestation occurring in Belarusian sector

Inconsistent policies of park management and conservation strategies in Belarusia and Poland

Forest is severely affected by bark beetle

Danger of the deterioration of contact between both sectors after Poland's access to the EU



JHEX/Promedia

### REGIONAL CONTACTS

Józef Popiel, Managing Director of Biełowieża National Park (Poland), [dyrektor@bpn.com.pl](mailto:dyrektor@bpn.com.pl)

Arkadiusz Nowicki, Director of The Board of Polish National Parks, [kzpn@mos.gov.pl](mailto:kzpn@mos.gov.pl)

### USEFUL LINKS

<http://www.bpn.com.pl/eng/scientific.htm>

<http://www.mos.gov.pl/kzpn/>

<http://www.bison.zbs.bialowieza.pl> <http://las.ibles.waw.pl>

<http://hbc.bas-net.by/bcb/>

<http://www.president.gov.by/Minpriroda/bio/index.html>

<http://bp21.org.by/>

<http://www.minpriroda.by>

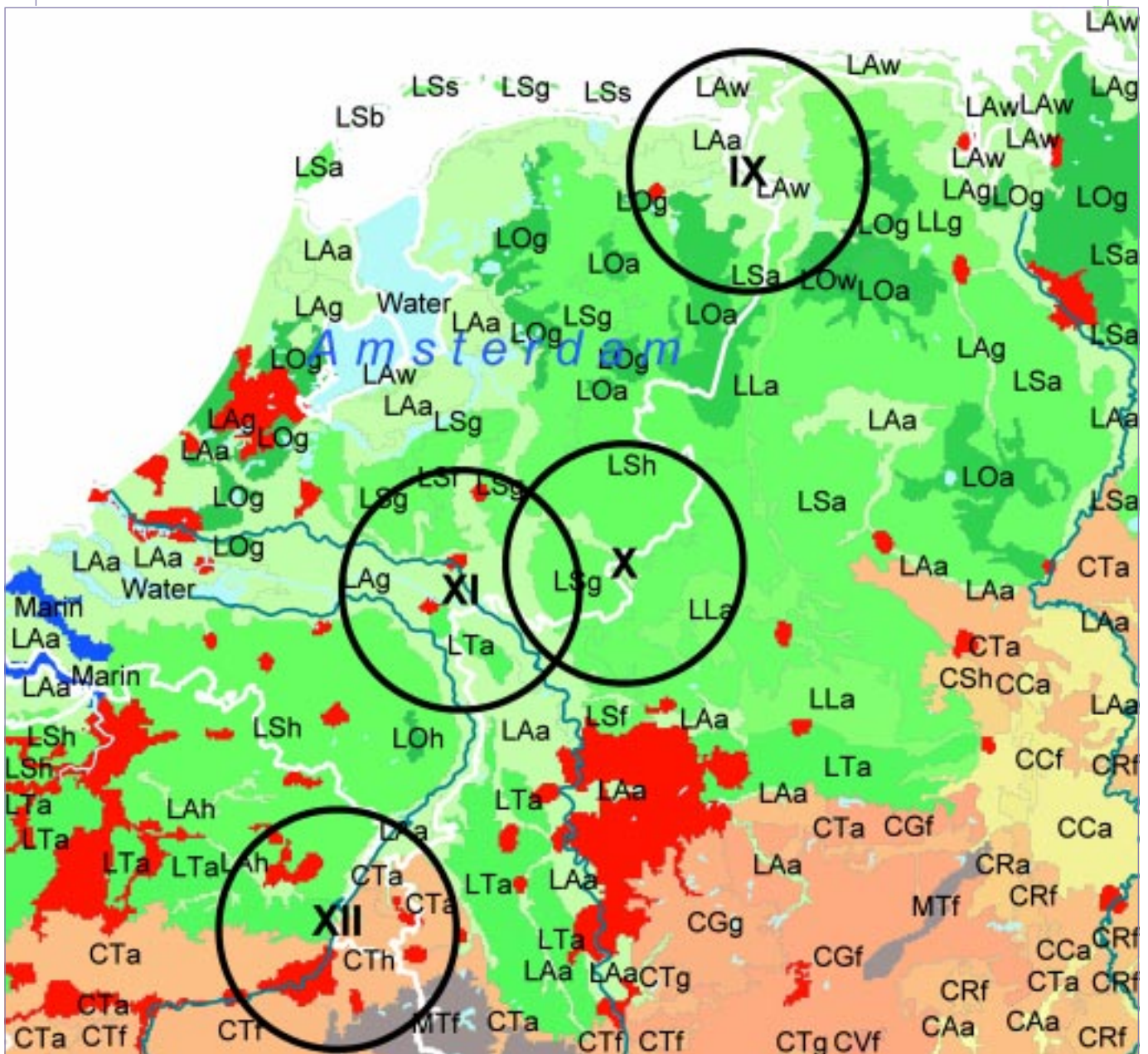
### 4.3 Atlantic Landscapes

European Atlantic landscapes include the British Isles, the low countries around the complex delta of the Rhine, Meuse and Schelde Rivers (essentially former Western Germany), most of France (with the exception the Mediterranean), and the north-west coasts of the Iberian Peninsula. Despite the influence of the Atlantic Ocean, climatic conditions, geomorphology and land use differ considerably within this biogeographic region. In the United Kingdom and Ireland the climate is similar year-round due to offshore warm ocean currents that influence the temperature. In winter coastal Ireland has about the same temperature as the Mediterranean coast of France, but places eastward from there are, on average, cooler (for example London 6°). Deciduous trees grow extensively in the lowlands, pine and birch in

the uplands with only scrubby growth on the frequent sandy patches. South-eastern England has the most attractive agricultural landscapes, although there are numerous areas of chalk, sandstone and limestone forming local low uplands with relatively poor fertility – the lowlands and vales are much more attractive to settlement.

The North German Plain includes moraines near the Baltic with relatively sterile soils and sparse populations, but still provides ancient routes across a partially submerged landscape. Broad, sandy beaches line the northern North Sea coasts with a low coastal plain interior. The large depressions below sea level have been reclaimed, mainly in The Netherlands and to a lesser extent also in Germany, to create polder landscapes which extend arable land. The Ardennes plateau in the

**FIGURE 10. Transfrontier Case Study sites: (IX) Hund-Paapsand/Hond-Paap, (X) Twente/Achterhoek/Bentheim/Borken, (XI) Gelderse Poort and (XII) The Border Meuse at the German, Dutch and Belgian borders.**





**FIGURE 11. Transfrontier Case Study site (XIII) at the Brittany/Normandy border in France.**

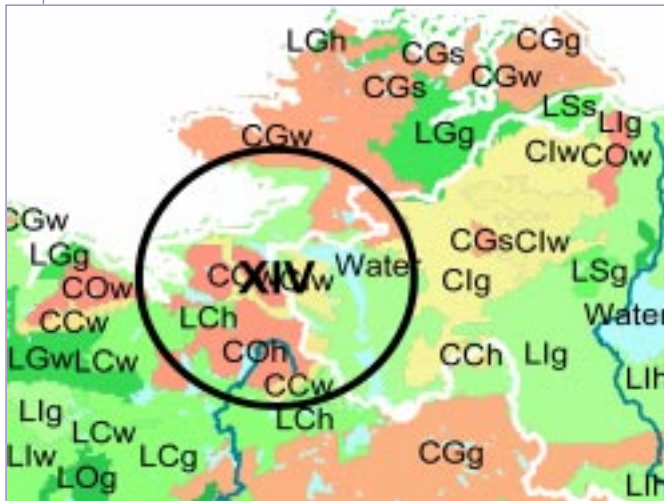
south-west and the valley-lands nearby, essentially the area near the river Ruhr as well as Liege and Mons, contain large coal reserves. Separated by the Rhine valley, the central uplands and foothill regions become more extensive and gradually higher in the south and south-east (Sauer land, Schwab land forest and Alpine foreland). The gentler-sloping regions of the southern foothills of Silesia and Saxony are the most suitable areas for agriculture (Russell *et al.* 1969).

Western France is split into the equally important lowland granaries of Paris (north-west) and Aquitaine (south-west) Basins, the hills of Brittany and Normandy being the biggest exceptions. The French climate is generally mild with ample precipitation increasing toward the east and south as the air masses encounter ever-higher slopes. The north-western part of the Iberian Peninsula experiences a maritime climate more like that of north-western Europe (Russell *et al.* 1969)

Cultural identity is closely associated with traditional agricultural landscapes, such as Atlantic bocage, traditional heathlands, polder landscapes and many locally characteristic cultural variations in farmhouses, footpaths, hedgerows and other linear features. Great concentrations of these are still to be found in the large agricultural belts in northern France, Flanders, Brabant, Friesland and most of the North German Plain (Wascher and Jongman 2004).

**Atlantic case studies in the context of European landscape units**

Transfrontier Case Study IX (Hund-Paapsand/Hond-Paap) is dominated by marine alluvial lowlands with coastal wetlands (LAW) and arable land use (LAa). The site itself is located in the middle of an estuary, in the brackish Waddensea (influenced by tidal changes in seawater level and the freshwater input by the River Ems) running parallel to the border river between The Netherlands and Germany.



**FIGURE 12. Transfrontier Case Study site (XIV) Breifne Mountains at the Irish/Northern Ireland border.**

Case Study X in Twente/Achterhoek/Bentheim/Borke consists of two main landscape units, lowlands on sandy grounds with pastures (LSh) and heterogeneous agriculture (LSg). Pleistocene sands are characteristic for most of the North-German and Dutch lowlands, north of the mountain range stretching from the Ardennes in Belgium to the Wiehengebirge in Lower Saxony. Within these lowlands, most of the previously extensive peat lands (LOa, LOg, LOw) have been exploited – recultivated and drained for agricultural land use – or are conserved and restored as nature conservation areas, partly protected as Natura 2000 sites.

The Gelderse Poort (Case Study XI) is located in the lowland of the Rivers Rhine and Maas/Meuse, forming a wide corridor of alluvial lowlands with pasture, mixed agriculture (LAg) and arable land (LAa), with a central larger patch of loamy grounds (LTa) crossed by the border between The Netherlands and Germany.

The Border Meuse between The Netherlands and Belgium (Case Study XII) illustrates how the river divides two larger geomorphological zones, namely the sandy and loamy heterogeneous agricultural lowlands (LSg, LTa) in Belgium from the arable hilly regions (CTa, CTh) in Limburg, The Netherlands.

In France, Case Study XIII is located at the Brittany/Normandy border. The main landscape units are arable and heterogeneous agricultural lowlands on crystalline rocks (LGA, LGh) bordering hilly units in central parts of Brittany and Normandy.

The border between Northern Ireland and the Republic of Ireland runs along upland organic grounds with lakes (Clw) and soft clay materials with wetlands (COW). Case Study XIV, the Breifne Mountains region, is ringed by foothills and lowland lakelands extending from Upper and Lower Lough Erne in County Fermanagh, Northern Ireland to Lough Arrow and Lough Key to the southwest and to the coastal zone from Sligo to Bundoran in the west.

## CASE STUDY IX Hund-Paapsand/Hond-Paap (Germany/The Netherlands)

**Ingolf Faida, Germany, District Authority Weser-Ems of Lower Saxony**

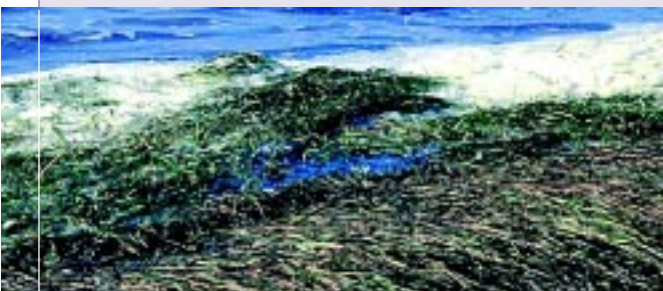


Photo: Siske Dissen (Foto Fliis)

The Hund/Paap is a tidal flat in the Ems-Dollart estuary (Dutch-German Waddensea area) near Delfzijl (The Netherlands). It becomes dry at low tide and is mostly sandy, partly muddy or a mixture of both. There is no vegetation, except for a widespread colony of seagrass (*Zostera marina*) in the centre, being the most important seagrass colony of the western Waddensea. The flat is located in a zone of decreasing salinity (about 20–27%) but nevertheless is the habitat of blue-mussel beds: in the southern and western parts large blue-mussel beds dominate the surface. At low tide the flat provides a source of food for hundreds of birds. About 50 different species visit – mainly geese, ducks, sea-birds and different kinds of snipe. This is of both local and international importance. Great numbers of seals rest in the north-east zone. A very special feature is a gas platform, which being built-up in the form of a small hill, provides a breeding-place for seagulls and cormorant (*Phalacrocorax carbo*). The only other man-made feature is a gas pipeline which crosses the flat under the surface. Human influence is minimal, apart from the practice of fishing for breeding mussels. In just 3–4 years some of the mussel-beds have been damaged or even destroyed.

The flat is located in an area that belongs partly to The Netherlands and partly to Germany. As there are differing opinions on the real frontier-line, both countries are in close co-operation on the basis of the Ems-Dollart-Contract. Both countries named the flat as a Natura 2000-Area (Habitats Directive [1130, 1140] plus Birds Directive) and they are proceeding to establish a common nature reserve.

The co-operation between regional authorities and the Dutch company Gasunie with regard to the technical planning and implementation for putting the gas pipeline deeper into the ground have been very positive. The marked-out route of the pipeline which is crossing Hund/Paap needed to be substantially lowered, requiring a tremendous technical procedure. By means of thorough trilateral communications between the company and the two national agencies the adequate scope for research activities was determined. Ecological assessments of the site's bird populations have been made possible through an additional project commonly commissioned by the German district authority and the Dutch agricultural ministry.



It is very likely that Hund/Paap would already be a bilaterally protected area if Lower Saxony would not insist in continuing to exploit its mussel banks by harvesting mussel offspring for commercial reasons. Both Lower Saxony's agricultural and environmental ministry have joined forces in maintaining this position. Currently, a dialogue between the Dutch and the Lower Saxony ministries have started to explore possible solutions for future fisheries in the Ems-Dollart-region. The outcome is still open.

## LANDSCAPE PROFILE

1. Landscape profile: Atlantic.
2. Landscape name: the Dutch-German border area in the Ems-estuary.
3. Landscape description:
  - Land forms: sandy, partly muddy eulitoral wadden-area (plate) in an extent of nearly 3,000 ha. An earth-bank/platform (ca 1 ha) in the central northern part of the plate with some low vegetation and technical infrastructure.
  - Vegetation: In the natural area no vegetation except for spreading clusters of *Zostera marina*.
  - Fauna: Large natural mussel beds (*Mytilus edulis*), particularly in the central and the southern area. Resting- and food-source area for thousands of birds (especially Gaviidae, Anatidae, Charadriidae, Scolopacidae, Laridae and Sternidae). Some species are nationally important (such as *Anas acuta*, *Numenius arquata*, *Tringa nebularia*, *Larus canus*, *Sterna hirundo*, and *S. paradisaea*) and some internationally important (such as *Tadorna tadorna*). The platform is a breeding-place for Laridae and *Phalacrocorax carbo*.
  - Crops: –
  - Landscape types: dry falling plate with tideways.
  - Protected areas: The whole area is named as Natura 2000 (bird and habitat directive) by The Netherlands and by Niedersachsen. It is planned that it will be declared as a bilateral conserved area (Naturschutzgebiet, staatsnatuurmonument).
  - Land uses: A crossing gas-pipeline underground, technical/physical documentations at the platform, recreation at some small places at the east-edge. Periodical fishing of seed mussels: this is a great problem because it suppresses the development of the mussel beds, reduces the food-source for birds and endangers the zostera fields.

## SWOT ANALYSIS

### STRENGTHS

Little human influence

Rich and reproductive ecosystem

Bilateral contract and nature conservation management

Increasing and well-established cross-boundary inter-agency contacts

### WEAKNESSES

Danger of breeding-mussel fishery

The sensitivity of the Waddensea ecosystem

### OPPORTUNITIES

Changes of government policy in Lower Saxony

### THREATS

Continuing mussel fishery

Water pollution

Growing interests of recreational use

### REGIONAL CONTACTS

Mr Marjan Datema, Ministerie van Landbouw, Natuurbeheer en Visserij, Postbus 30032, NL 9700 RM, Groningen  
Tel: 050-599 2325  
E-mail: m.datema@minlnv.nl  
Wasser- und Schiffsamt Emden, Am Eisenbahndock 3, 26725 Emden  
Ingolf Faida, Bezirksregierung Weser-Ems, Oldenburg, Germany  
Tel: 49/441.799-2293  
E-mail: Ingolf.Faida@br-we.niedersachsen.de





CASE STUDY X Twente/Achterhoek/Bentheim/Borken (Germany/The Netherlands)

Rob Jongman, Alterra, The Netherlands



Sprenghendal heathland remnant.



This landscape type generally occurs from northern Germany (Lüneburger Heide) to Flanders (Kempen). It consists of a mixture of Pleistocene sands with lower ice-pushed ridges as end moraines from the Saalien Ice Age and is dissected with numerous small lowland brooks within catchments of lowland rivers. The Pleistocene sands are situated in three countries: Germany, The Netherlands and Belgium. All three have their own national and even regional history. Historical differences are evident in the present landscapes. Around 1900, the division in land use was partly arable, partly meadow, with large extents of lowland heath.

Table 2 shows that land use developed differently on both sides of the border. Even on the same soil types, with comparable environmental conditions, landscapes developed differently. In The Netherlands small-scale landscapes dominate; in Grafschaft Bentheim small-scale and large-scale landscapes are more evenly distributed. On the rich soils of The Netherlands where Carpinion forests occur, linear features no longer exist and it is dominated by small-scale landscapes. The conclusion is that history and policy have left their mark and will continue to affect the future. At present, the planning of linear features as ecological and/or water corridors are mainly considered within the immediate administrative region. Between the Kreis Borken and the Province of Gelderland there is an emphasis on the protection of small rivers and lowland brooks on both sides of the border. Neither side, however, considers the rivers as they end 5 km from the border. Figure 13 shows planning maps from both sides of the border.

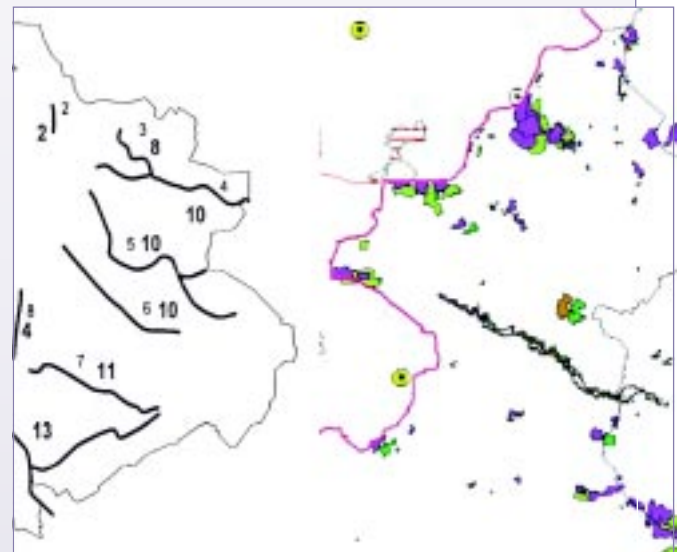
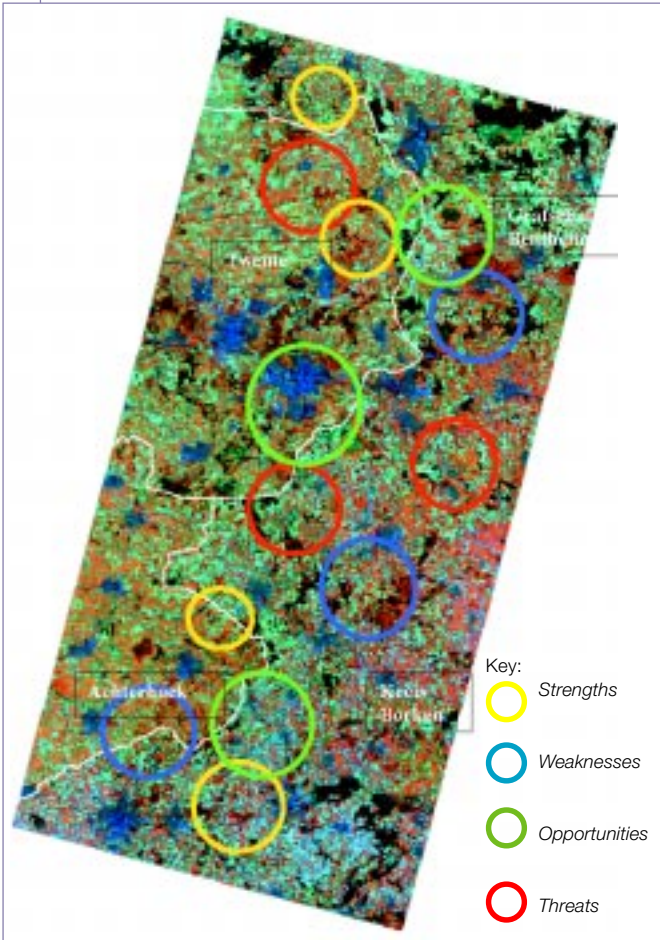


FIGURE 13. Planning maps from either side of the border.

**TABLE 2. Diversity in vegetation types in landscape elements in Twente (The Netherlands) and the adjacent part of Grafschaft Bentheim (Germany) subdivided for small-scale, large-scale landscapes, mixed landscape and forest-dominated landscapes. In Twente 51 and in Bentheim 52 sampling sites have been made.**

|                     | Twente landscape |             |           |          | Bentheim landscape |             |           |          |
|---------------------|------------------|-------------|-----------|----------|--------------------|-------------|-----------|----------|
|                     | Small-scale      | Large-scale | Mixed     | Forest   | Small-scale        | Large-scale | Mixed     | Forest   |
| Fago-Quercetum      | 5                | 6           | 5         |          | 3                  | 5           | 3         |          |
| Alnus-Glutinosae    | 10               | 3           | 6         |          | 12                 | 11          | 8         |          |
| Alno-Padion         | 13               |             | 1         |          | 2                  | 1           |           |          |
| Carpino-Berberidion |                  |             |           |          | 3                  | 1           | 1         | 2        |
| <b>Total</b>        | <b>28</b>        | <b>9</b>    | <b>12</b> | <b>0</b> | <b>20</b>          | <b>18</b>   | <b>12</b> | <b>2</b> |

Goema Connecties and FTH-gabiate



### LANDSCAPE PROFILE

1. Landscape typology code: LSh (Lowlands on sandy grounds with pastures), LSg (Lowlands on sandy grounds with heterogenous agriculture), LOa (Lowland on organic grounds with arable land cover), LOg (Lowland on organic grounds with heterogenous agriculture), LOw (Lowland on organic grounds with wetlands).
2. Landscape name: Lowland brooks landscape of Twente-Bentheim.
3. Landscape description:
  - Climate: Atlantic.
  - Land forms: The relationship between historical land use and landscape patterns can especially found in forests and linear features and these are also important for cultural-historical and biodiversity aspects of the cultural landscape.
  - Vegetation/species: In a comparative study between adjacent regions on the Pleistocene sand area of Germany and the Netherlands, Grafschaft Bentheim and Twente in the Netherlands species number, landscape structures (hedgerows, wooded banks) and vegetation diversity (plant community types) has been analysed. There is a significant difference in species richness between Twente and Bentheim caused by the greater variety in species of wooded banks (131 and 109 respectively) and in the variety in vegetation frequency in wooded banks (Table 2).

## SWOT ANALYSIS

### STRENGTHS

Heterogeneity in landscape and relatively high biodiversity

Regional identity and tourist market in Twente/Achterhoek

Strong network of volunteer organisations in Twente Achterhoek

### WEAKNESSES

Landscape heterogeneity and biodiversity depends on linear features and heath remnants

Weak regional identity and tourist market in Bentheim/Borke

Mainly policy dependent in Grafschaft Bentheim and Borke

Low agricultural prices and high labour/land costs

### OPPORTUNITIES

Potential multi-functional (rural tourism, nature conservation, regional products)

Increasing demand for quality food products: meat, cheese, hams, honey

New orientations of CAP

### THREATS

Land-use change under urban pressure, suburbanisation

Intensification: no tree replanting, no landscape management

Disappearance of accessibility of rural areas

### CONTACTS

#### REGIONAL AUTHORITIES

LNV-oost Harrie Alberts, postbus 554, 7400 AN Deventer, Nederland

E-mail: H.Alberts@Invo.agro.nl

Bezirksreg. Münster, Ob.Landschaftsbehörden

Helmut Beckmann, Domplatz 1-3, 48128 Münster, Deutschland

E-mail: helmut.beckmann@bezreg-muenster.nrw.de

#### NATIONAL/REGIONAL NATURE AND LANDSCAPE ORGANISATIONS

Biologische Station Zwillbrock e.V., Dietmar Ikemeyer, Zwillbrock 10, 48691 Vreden, Deutschland

E-mail: info@bszwillbrock.de

Vereniging Natuurmonumenten, Betty van Leeuwen,

Emmastraat 7, 78011 AE Zwolle, Nederland

E-mail: b.vanleeuwen@natuurmonumenten.nl

#### USEFUL LINKS

<http://www.aktion-gruenes-band.de/>

## CASE STUDY XI Gelderse Poort (The Netherlands/Germany)

*Marijn van der Wagt, Research Institute Spatial Planning, The Netherlands*



The Dutch-German border area near the cities of Arnhem and Nijmegen contains diverse landscapes. The area can be divided into three parts: first, the sandy soil area of the Achterhoek; second, the Veluwe, a hilly area that formed its morenic ridges in one of the Ice Ages; and third, the river district around the Rivers Rijn and Waal, a landscape with slight relief caused by the dynamic of the rivers. Here the climate is moderate and the land use mainly agricultural, as in the Achterhoek. The morenic ridges of the Veluwe region are mainly covered with forests, with the exception of some bare sand hills, a few moors and some agriculture. The Veluwe region is protected as a national park representing one of the key tourist attractions in The Netherlands. It is one of the few areas in this part of the country with slight elevation changes. These moraines continue near the city of Nijmegen, in the Achterhoek region and across the border into Germany.

Until the 1850s most farmers earned their livelihoods through cattle breeding and market gardening. Large parts of the Veluwe and the Achterhoek such as the moors and bare sandy areas were not in use for agricultural purposes. This ground was seen as common property and was used to graze cattle and collect turf for fuel. At the beginning of the 19th century, a period of economic decline, the government decided to put this land into production, using it for cultivation, agriculture and forestry. The Veluwe forest originates from this period.

The river area had underdeveloped agriculture because of its remote access, the scattered location of growing plots, an inefficient water system and the unfavourable location of the many small farms. The dynamic of the river caused a great variance in the usefulness of the

land. The structure that existed before 1950 was too inefficient and in modernisation the landscape was changed dramatically. The original fine-meshed pattern all but disappeared to be replaced by large rectangular plots. Many new roads were constructed and old roads were straightened. This is how the landscape remains today.

### SWOT ANALYSIS

#### STRENGTHS

**Co-operation between municipalities in the river district, especially Arnhem and Nijmegen**

**The Veluwe region serves as an important area for outdoor recreation**

**Commitment of international co-operation**

**Project for developing nature and water storage**

#### WEAKNESSES

**Different government systems on both sides of the border**

**Tourist developments are in conflict with the aims of nature-conservation organisations**

#### OPPORTUNITIES

**Further international co-operation**

**Dynamic river system and more areas to buffer water**

#### THREATS

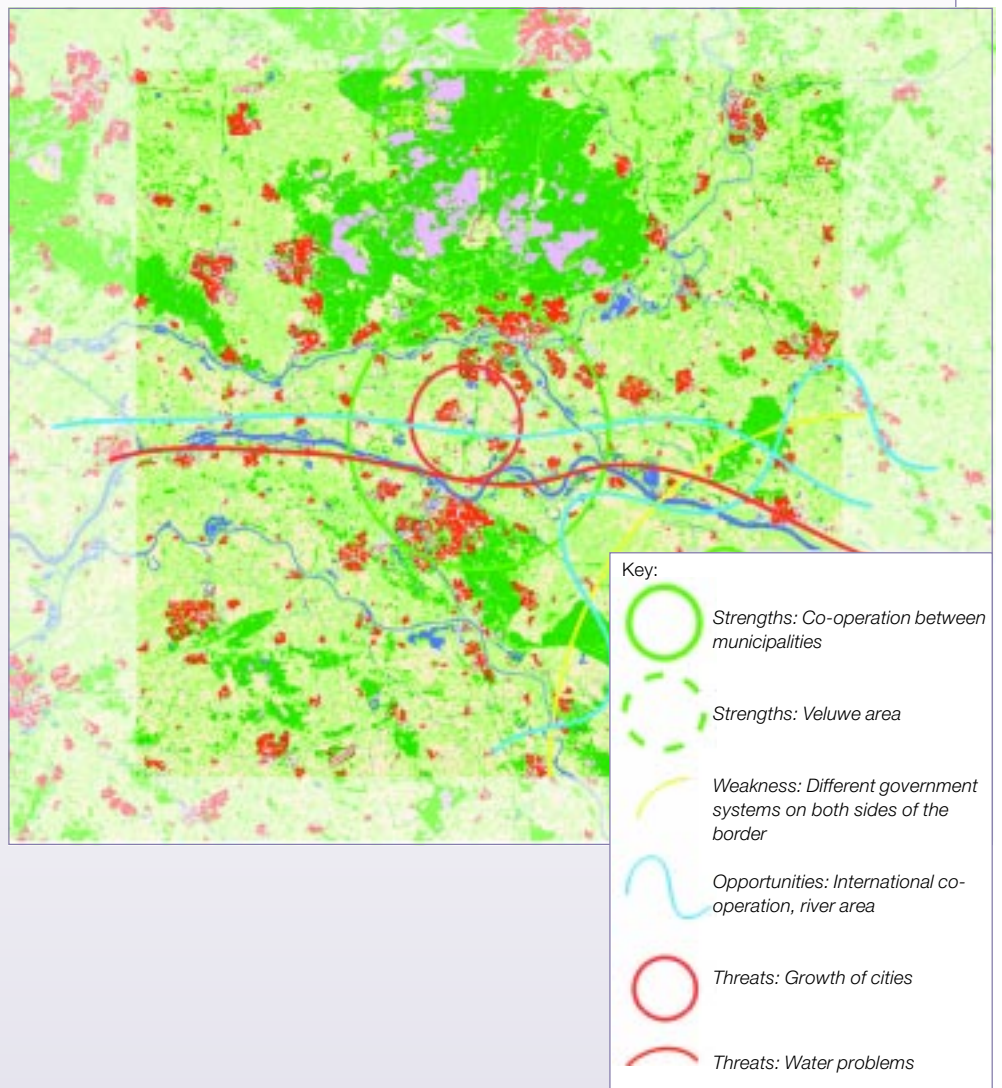
**The cities of Arnhem and Nijmegen are growing, both in population and economically**

**Problems with the water level in the rivers, the lack of water in summer and inability to carry off water in winter**

**Holiday homes and resorts in the Veluwe region**

## LANDSCAPE PROFILE

1. Landscape typology code: LAg (Lowland on alluvial grounds with heterogenous agriculture), LAa (Lowland on alluvial grounds with arable land cover), LTa (Lowland soft loamy grounds with arable land cover).
2. Landscape name: The Dutch-German border area near Arnhem and Nijmegen.
3. Landscape description:
  - Land forms: Flat with morenic ridges in the north and the middle of the region.
  - Vegetation/species: varieties of grass, originally deciduous trees.
  - Crops: potatoes, maize, cereals, grass.
  - Landscape types: meadows in the river district and the eastern part of the region, forest and sand drifts on the morenic ridges of the Veluwe.
  - Protected areas: parts of the Veluwe area.
  - Land uses: agricultural use in the river district and the eastern part of the region, ongoing urbanisation between the cities of Arnhem and Nijmegen, tourism on the Veluwe hills and in the eastern part of the region.



## REGIONAL CONTACTS

Marijn van der Wagt,  
Ruimtelijk Planbureau  
E-mail: [Wagt@rpb.nl](mailto:Wagt@rpb.nl)

Maike Galle,  
Ruimtelijk Planbureau  
E-mail: [Galle@rpb.nl](mailto:Galle@rpb.nl)

## USEFUL LINKS

<http://www.rpb.nl>  
<http://www.rww.nl>  
<http://www.euregio.org>

## CASE STUDY XII The Border Meuse (Belgium/The Netherlands)

*Geert de Blust, Instituut voor Natuurbehoud, Belgium*



With a drainage basin of about 33,000 km<sup>2</sup> and a length of 890 km, the River Meuse is one of the larger rivers in Europe. The river has its sources in north-east France and runs through France, Belgium and The Netherlands. Likewise, the catchment basin extends into these countries, as well as into Germany. Between the cities of Maastricht and Stevensweert, the Meuse forms the border between Belgium and The Netherlands. This stretch is called the Border Meuse or Common Meuse. The river is a typical rain-river. Consequently, discharges can fluctuate enormously, especially in the stretch downstream from the Ardennes Meuse which has a rather low storage capacity.

Landscape development, current landscape characteristics and land use, are to a large extent determined by the dynamics of the river. Gravel is deposited in the floodplain and as terraces alongside the alluvial plain. These sediments were and are extracted from the river bed, as well as from the plain and from the terraces. Therefore they are an important part of the

economic activities in the region. As a result of these extractions, the river bed was deepened and large water bodies covered the floodplain. The latter, combined with the unnavigable (i.e. for commercial shipping) Border Meuse, offers extended water recreation. Industrial activities, the development of agriculture in the river foreland and the urban increase, have finally made the authorities regulate the river and establish a system of winter and summer dykes.

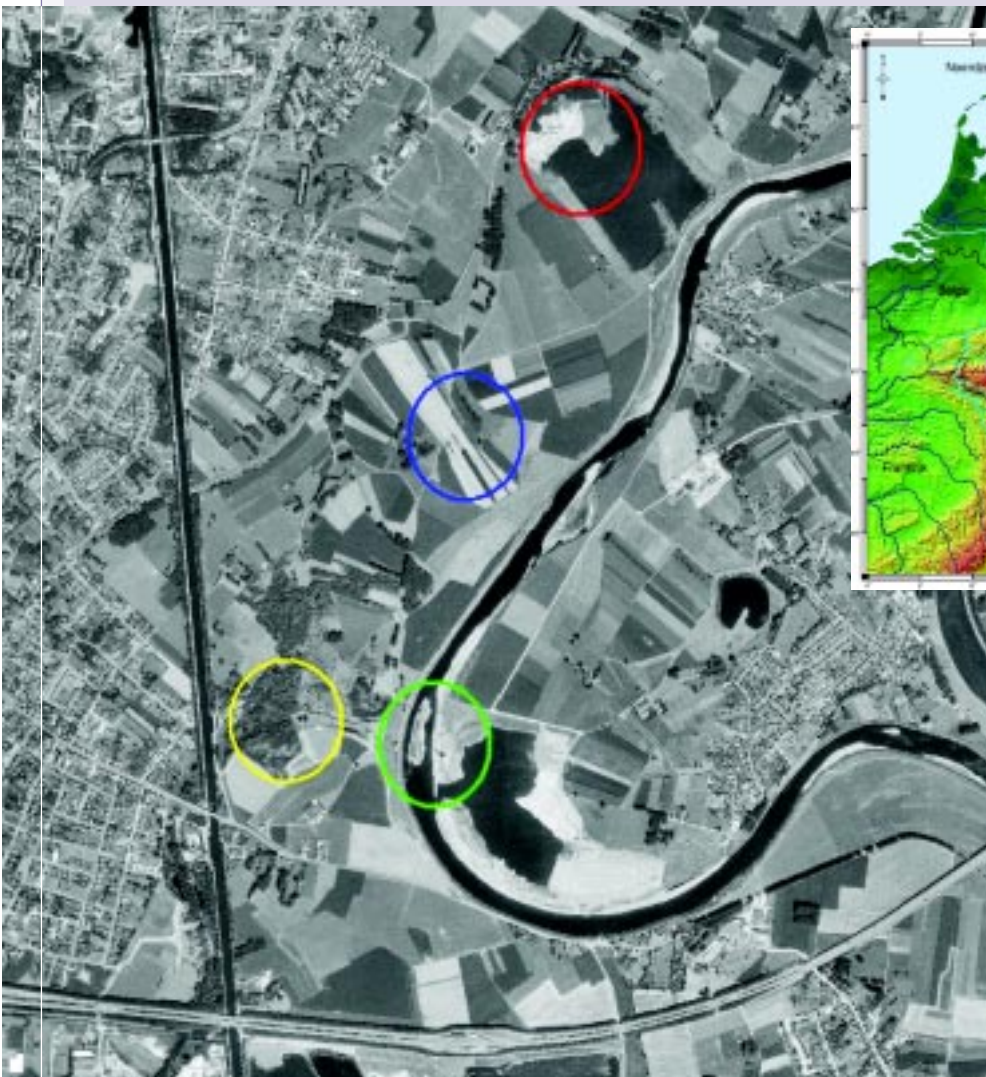
The resulting restriction of the river and the loss of floodplain have fragmented the once continuous fluvial landscape and have isolated river foreland ecosystems from the essential hydromorphic dynamics of the river.

In spite of this, the Border Meuse and its valley are still very important for biodiversity and nature conservation. The potential for nature development is equally high due to the characteristics of the species and ecosystems concerned: pioneer systems, species adapted to highly dynamic environments, the 'open' nature of the system, the biogeographical position (fluvial district) and the coincidence with major migratory routes. Recognition of the existing nature and landscape qualities, the rise of new social demands regarding nature conservation, recreation, environment and water management, urged the development of an integrated approach to high water risk management. The challenge was to rehabilitate the river characteristics in harmony with land use functions, nature development and an ecologically sound river management and targeted flood protection plan. Comprehensive international co-operation between The Netherlands and Belgium was the only way to achieve this goal.



## LANDSCAPE PROFILE

1. Landscape typology code: LSg (Lowlands on sandy grounds with heterogenous agriculture), LTa (Lowland soft loamy grounds with arable land cover), CTa (Upland loamy grounds with arable land cover), CTh (Upland loamy grounds with pastures).
2. Landscape name: Grensmaas, Gemeenschappelijke Maas.
3. Landscape description:
  - Climate: average precipitation 775 mm.
  - Land forms: incised valley; alluvial plain (summer and winter bed of river) between 42 m TAW (upstream) and 28 m TAW (downstream). Deposits consist of a layer (1–2 m thick) of loam or clay in depressions and sand on banks covering gravel layers (10–20 m thick). Outside the alluvial plain: fluvial sand/gravel terraces (up to 100 m TAW) with sand cover. North of the Feldbiss fault the Bocholt plain has the same deposits as the terraces.
  - Vegetation/species: area mainly covered by pastures and intensively used hay meadows, arable land and open water (gravel pits). High nature qualities (Red List species) are situated in alluvial grasslands (variety determined by flooding frequency), tall herb vegetation, scrub and remnants of riverine woodland. Forest and conifer plantations on the slopes and plateau of the terraces. The river sustains important fish communities and pioneer bars and bank vegetations. Number of species: to be completed.
  - Crops: dairy farms and corn production, arable land, horticulture and orchards are expanding.
  - Landscape types: impounded river, partly with artificial stony banks. Flat alluvial plain with steep and deep gravel pits and a limited number of shallow oxbow lakes and recently established flood channels. River foreland is partly small scaled (network of linear landscape elements), partly large scaled e.g. Bocholt and the filled up gravel pits that are turned into agricultural land.
  - Protected areas: nature reserves are established on both the Belgian and The Netherlands side of the area.
  - Land uses: limited urbanisation in the winter bed; main conurbations on the foot of the terraces. Agriculture is main land use. Tourism linked with gravel pits (marinas). Drinking-water extraction.



Key:

- Strengths: landscape and biodiversity
- Weaknesses: conflicting land use
- Opportunities: river dynamics
- Threats: expanding gravel extraction

## SWOT ANALYSIS

### STRENGTHS

Actual landscape and biodiversity qualities

Important area for outdoor recreation activities

Availability of an extensive plan of action

Commitment for international co-operation on highest political level. Clearly stated objectives

Well-established organisation, including private and public bodies

Projects in integrated water management combining nature development/high water storage/ecological river management/recreation/education and serve as demonstration projects

Well-established integrated monitoring

Hydraulic, hydrological, ecological research for over 10 years

### WEAKNESSES

Participation of general public

Uncertainty about ongoing public financing

Uncertainty about integral execution of the plan

Conflicting land uses, still to be harmonised

Tardy process of international co-operation, different management in the two regions involved

### OPPORTUNITIES

Further international co-operation regarding river and water management

Transboundary natural river park

Dynamic river that may shape the landscape desired in future

### THREATS

Growing number of water-based recreational activities

Pollution by heavy metals and debris during flooding

Expanding gravel extraction

Ongoing fragmentation of the river

### REGIONAL CONTACTS

Administratie Milieu-, Natuur-, Land- en Waterbeheer Afdeling  
Natuur, Graaf de Ferraris-gebouw, Koning Albert II-laan 20,  
bus 8, 1000 Brussel

Administratie Waterwegen en Zeewezen, Afdeling Maas en  
Albertkanaal, Lombaardstr. 26, 3500 Hasselt

De Maaswerken, Avenue Ceramique 125, Postbus 1593, 6201  
BN Maastricht, [www.demaaswerken.nl](http://www.demaaswerken.nl)

IMC, Internationale Maascommissie, Palais des Congrès,  
Esplanade de l'Europe 2, B-4020 Liège, [www.meuse-maas.be](http://www.meuse-maas.be)  
European Centre for River Restoration, [www.ecrr.org](http://www.ecrr.org)

### USEFUL LINKS

<http://www.maaswerken.nl> (Maaswerken: co-operation of official institutions in The Netherlands)

<http://www.cipm-icbm.be/default.asp>

[www.meuse-maas.be](http://www.meuse-maas.be) (Internationale Maascommissie)

<http://www.instnat.be> (Institute of Nature Conservation; research and monitoring)

## CASE STUDY XIII Brittany/Normandy (France)

Jacques Baudry, *Institut National de la Recherche Agronomique, France*



Brittany

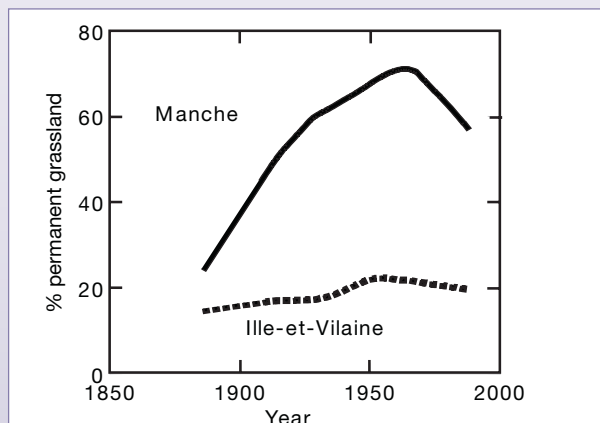


Normandy

The landscapes are in northern France separated by the ancient border between Brittany and Normandy, in the Atlantic zone. These two landscapes border the Mont-Saint-Michel Bay and are subject to strong maritime influence from north-west/west winds.

Valley landscapes: in Normandy, pastures typically spread from the stream upslope, whereas in Brittany they are restricted to the hydromorphic zone. These patterns developed historically and have important consequences nowadays. In Brittany, when they are maintained, stream corridors are mainly lightly grazed, while in Normandy the stocking rate is higher as a large part of the pasture has no physical constraints. Consequences may be important for water quality. Both landscapes are characterised by the presence of hedgerows; but only in Manche it is called 'Bocage' by the local population. In both areas hedgerow removal has been important since the 1960s. The two adjacent landscapes exhibit different patterns: while in Brittany fields alongside streams are small, restricted to the narrow hydromorphic area and creating a clear cut stream corridor, in Normandy fields are much larger and include both wet and non-wet areas.

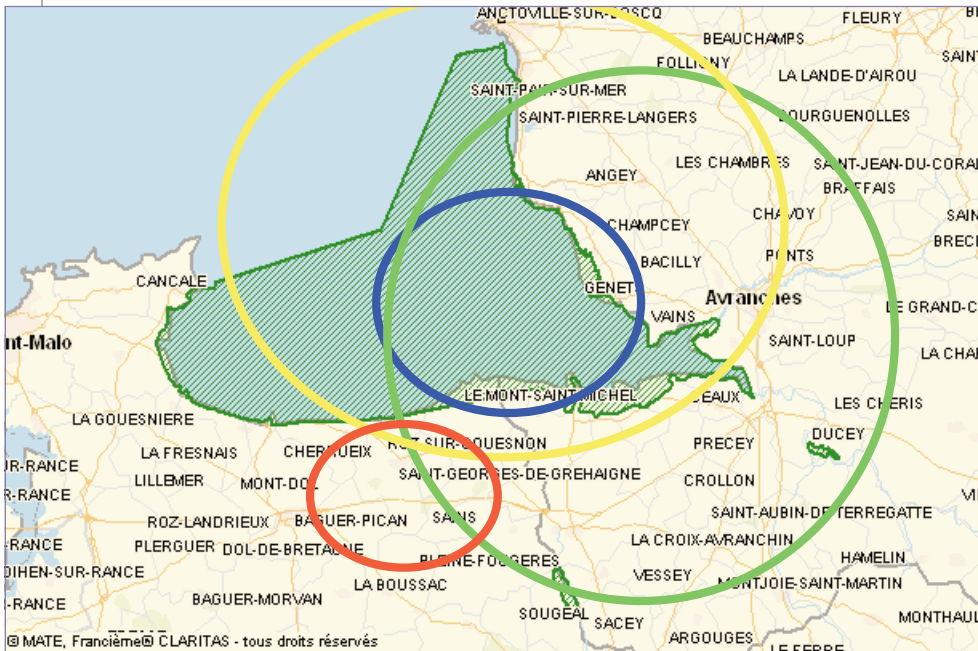
**FIGURE 14. Changes in % cover of permanent grassland.**



### LANDSCAPE PROFILE

1. Landscape typology code: LGa (Lowland chrysaline/magmatite ground with arable land cover), LGh (Lowland chrysaline/magmatite ground with pastures).
2. Landscape name: Normandy and Brittany.
3. Landscape description:
  - Climate: These two landscapes differ in the amount of rainfall. It varies from 600 mm to 1,100 mm in the Manche and between 600 and 900 in Ille-et-Vilaine. This may partly explain the differences in land cover, especially permanent grassland (grassland older than 10 years) as shown in Figure 14. Temperature is mild, rarely dropping below freezing. Summers are cool.
  - Land forms: Gently rolling slopes on ancient bedrock (granite and shale).
  - Vegetation/species: Oak (*Quercus pedunculata*) chestnut (*Castanea sativa*) ash (*Fraxinus excelsior*).
  - Crops: (Permanent and rotational) maize (silage and grain) cereals, cider apple.
  - Landscape types: Tidal flats, polder and bocage.
  - Protected areas: The bay is a World Heritage Site, Natura 2000, the main Normandy valleys are also Natura 2000 sites.
  - Land uses: Land use is dominated by agriculture (dairy farming), except in the polders south of the bay (a few hundred hectares) that are used for vegetable and crops such as maize or wheat. There is little urbanisation. The main crops are grassland (permanent and rotational) and maize, with few cereal crops.





- Key:
- Strengths: well-structured bocage (hedgerow network landscape)
  - Weaknesses: management requires co-operation between administrative regions
  - Opportunities: the Mont-Saint-Michel is a World Heritage Site with rich culture and wildlife
  - Threats: poor hedgerow management threatens both hedgerows and biodiversity

## SWOT ANALYSIS

### STRENGTHS

- A coastal/marshland landscape of international value (Mont-Saint-Michel Bay)
- Inland landscape Bocage (hedgerow networks) a characteristic of cultural landscape heritage
- Cheese (Camembert) and apple brandy (Calvados) under a Appellation Contrôlée label (Normandy)
- Rivers with trout and salmon (Normandy)
- A wide diversity of landscapes with both aesthetic and biodiversity value
- Many sunken roads bordered by hedgerows as hiking trails
- A large number of summer houses (Normandy)

### WEAKNESSES

- Poor co-operation between Brittany and Normandy to manage the area
- Aging population (Brittany and Normandy)

### OPPORTUNITIES

- Millions of visitors to Mont-Saint-Michel can foster tourist activities inland
- Use the image of local products to sustain milk and apple production as part of attraction (Normandy)
- Managing a well-conserved cultural landscape with ancient hedgerows, grassland with rich flora

### THREATS

- A rapid decline of the number of farmers
- EU premium for maize accelerates land cover changes (from permanent grassland to arable land)
- Decline of river water quality due to increase in stocks (Normandy)
- Concentration in agribusiness may adversely affect quality of labelled products (Normandy)
- Decreasing workforce in farms threatens landscape management (hedgerows) (Normandy)
- Decreasing workforce in farms threatens landscape management (Brittany)
- Aging trees in hedgerows
- The traditional pruning method (climbing trees) is difficult to maintain (Brittany)

### USEFUL LINKS

- Normandy:
- <http://www.environnement.gouv.fr/basse-normandie/> (Environment administration)
  - <http://www.cr-basse-normandie.fr/> (administrative unit)
  - <http://www.pere-magloire.com/terroir.php?visu=appellation> (Appellation for calvados)
- Brittany:
- <http://www.environnement.gouv.fr/bretagne/> (Environment administration)
  - <http://www.bretagne-environnement.org/>
  - <http://www.region-bretagne.fr/CRB> (administrative unit)

## CASE STUDY XIV Breifne Mountains (Republic of Ireland/Northern Ireland)

**John H. Morris, Geological Survey of Ireland, Ireland**

Situated in the north-west of the island of Ireland, the informally-termed 'Breifne Mountains' region consists of a number of discrete mountainous uplands in the border area between the Republic of Ireland and Northern Ireland. Together, these mountains define a geographically distinct upland region readily visible on maps, and even satellite photographs. The highlands are ringed by foothills and lowland lakelands extending from Upper and Lower Lough Erne in County Fermanagh, Northern Ireland to Lough Arrow and Lough Key to the south-west and to the coastal zone from Sligo to Bundoran in the west.

The region has a relatively low profile both within the island of Ireland, as well as internationally, and it has suffered from economic disadvantage due to the civil unrest which has afflicted this part of Ireland for over 30 years. It is, however, a region moulded from a very distinct geological foundation, which serves both to integrate the region as well as provide the base structure for a wealth of other types of natural and cultural heritage. Based upon the Cultural Parks concept, conceived and established in the Autonomous Region of Aragon, Spain (Cultural Parks Laws, Government of Aragon, 12/1997 and 3/1999), a consortium of five local authorities, two national geological surveys and a university have successfully promoted and secured EU funding for a major, €2.5M project to define and create a suite of natural and cultural resource-based products to enhance sustainable tourism and rural economic development in the region. A very small part of the region has already been designated a European Geopark.



*The Cuilcagh Mountains, looking north from within the Republic of Ireland. The border between the Republic and Northern Ireland runs along the crest of this range of mountains.*

The project commenced formally in August 2003. One of the initial actions has been to commission a Landscape Characterisation Assessment of the physical foundation of the entire region. When complete in early 2004, this will provide the framework for all other actions, which include the development of a web-based natural and cultural heritage GIS, a range of publications and a set of digital products including a virtual reality simulation of the physical evolution of selected parts of the region. It is consequently too premature at present to attempt to provide the level of landscape character detail readily available for more advanced assessments in other parts of Europe. Such details will become available in time, but it is through participation in this forum and learning from other experiences that the outcome of the Breifne project will be considerably enriched.


Prior to the establishment of a national border following Irish independence in 1921, social, economic and cultural activities were totally interconnected across the Breifne region. While these contacts were maintained to a large degree over ensuing decades, more substantial barriers only emerged subsequent to the start of civil unrest in this part of Ireland in 1969. This resulted in the economic marginalisation of communities on both sides of the border, and a partial failure to share fully in rising economic prosperity since then. The advent of the current peace initiative has now created the opportunity to contribute to redressing these imbalances by attempting to create a strong, cross-border regional identity based upon the sustainable development of the total natural and cultural landscape of the region.


### LANDSCAPE PROFILE

1. Landscape typology code: CLw (Upland soft clay materials with wetland cover), COw (Upland organic materials with wetland cover).
2. Landscape name: Breifne Mountains
3. Landscape description:
  - Climate: Atlantic.
  - Land forms: Mountainous uplands, with fringing lakelands.
  - Vegetation/species: Blanket bog, natural woodlands, Sitka spruce plantations.
  - Crops: Yet to be defined.
  - Landscape types: Yet to be defined.
  - Protected areas (nationally and internationally): Cuilcagh Mountains SAC.
  - Land uses (agriculture, urbanisation, tourism): Forestry, upland rough pasture, eco-tourism, caves.




Key:

 Outer boundary of the project region

 Core upland region, which will be the focus of project actions

The intervening zone contains a number of well-established tourism destinations (Fermanagh lakelands and Enniskillen; Sligo and Bundoran, and the coastal zone between these two towns).

 Border

 Approximate location of the Breifne Mountains region

The Marlbank, County Fermanagh looking west across Lough Erne.



A detailed SWOT analysis for the region is not available at present, as the assessment process has only recently commenced.

## SWOT ANALYSIS

### STRENGTHS

Marble Arch Caves

Lough Erne water sports

Rugged mountain scenery, low population

Long distance walking routes

Wilderness

Archaeological zones (Bricklieves)

### WEAKNESSES

Tourism infrastructure

Identity awareness deficit

Few attractions away from major tourism hubs

Disjointed promotion

Overall lack of integrated plan to manage the region and its sustainable development

### OPPORTUNITIES

Wilderness trekking

Integrated eco-tourism

Expand European Geopark area

### THREATS

Adverse impact of 30 years of civil unrest

Wind farms

Climate change – destruction of blanket bog

### REGIONAL CONTACTS

#### BREIFNE MOUNTAINS REGION PARTNER CONSORTIUM

Cavan County Enterprise Board (Project leader) Cavan Innovation and Technology Centre, Dublin Road, Cavan  
Ireland Fermanagh District Council Town hall, Enniskillen, County Fermanagh, Northern Ireland

Cavan County Council The Courthouse, Cavan, County Cavan, Ireland

Leitrim County Council Aras an Chontae, Carrick-on Shannon, County Leitrim, Ireland

Roscommon County Council Courthouse, Roscommon, Ireland  
Sligo County Council Riverside, Sligo

Ireland University of Ulster, Academy for Irish Cultural Heritages, Magee Campus, Northland Road, Derry/Londonderry, BT48 7JL

Northern Ireland Geological Survey of Northern Ireland 20, College Gardens, Belfast, BT9 6BS, Northern Ireland

Geological Survey of Ireland, Beggars Bush, Haddington Road, Dublin 4, Ireland.

#### USEFUL LINKS

[www.gsi.ie](http://www.gsi.ie) (Geological survey of Ireland: *Geology for everyone* contains guides and views of the region)

[www.seupb.org](http://www.seupb.org) (EU programme where the definition of the landscape is being characterised)

[www.showcaves.com/english/ie/showcaves/MarbleArch](http://www.showcaves.com/english/ie/showcaves/MarbleArch) (The Marble Arch Caves, County Fermanagh)

[www.kilronanparishwebsite.com/KilronanParishSite/MiningHistory](http://www.kilronanparishwebsite.com/KilronanParishSite/MiningHistory) (views of the coal mining heritage)

[www.leitrimtourism.com](http://www.leitrimtourism.com) (views of County Leitrim)

[www.arrowlodge.com/archaeology](http://www.arrowlodge.com/archaeology) (views of the landscapes and archaeology of Sligo and Roscommon)

[www.arignaminerswayandhistoricaltrail.com/loop12](http://www.arignaminerswayandhistoricaltrail.com/loop12) (walking trails)

[www.allen.ie/dowra](http://www.allen.ie/dowra) (views of Shannon Port and surrounding areas, County Cavan)

## 5 Review of the Case Studies

The case studies presented in this report are the result of a volunteer collaboration by a large group of national and international experts. Their location and characteristics do not respond to any previous selection and show remarkable heterogeneity. They cover a range of borders: regional (Lombardy/Piedmont in Italy; Brittany/Normandy in France; five municipal districts of Lagadas County in Greece) and national dealing with trilateral (Czech Republic/Germany/Austria) and bilateral borders (the remaining studies). They are located in very different geographical areas of the European continent (Figure 4), showing therefore many biogeographical differences in parent material (e.g. alluvial sediment, calcareous rocks, organic materials), climate (e.g. Mediterranean, Continental, Atlantic), altitude (from Lowlands to Alpine) and land uses (e.g. agricultural, forest and semi-natural, wetlands and water bodies), as shown in the introduction to each landscape type. These geographical differences result in distinct economic, socio-cultural and environmental key-issues (Table 3). Most of these issues are common to other kinds of landscapes. However, the following issues appear to be intrinsic for transfrontier landscapes:

1. The role of rivers, water bodies and mountain chains as essential landscape features in the transfrontier landscapes presented: the rivers Douro, Ticino, Elbe/Donau, Ems/Dollart, Rijn, Waal and Meuse; the lakes Fertő/Neusiedler, Koronia Lake, lowland lakes in the Breifne Mountains; and the Iberic zócalo, Alps, Appenines, Šumava Mountains, Breifne Mountains.
  2. The crucial impact of past history (civil wars, invasions) and the consequent political changes in the frontier areas, underlines the divisive effect of natural borders. Originally, natural borders such as rivers, lakes, mountains and forests, are used as frontiers between regions. However, their real role as borders to separate regions with different economic, socio-cultural and environmental perspectives is finally determined by political reasons. The examples of the Šumava Mountains and the Bielaviezhskaya Pushcha show the dramatic impacts of WW2 and the communist invasions during the 20th century on the different development of the transfrontier landscapes.
- Consequently, landscape policy at national and European levels plays an essential role in the future development of these areas.
3. These landscapes are highly heterogeneous mainly due to their very diverse geographical features and intense historical heritage. This heterogeneity results in a highly multi-functional potential for rural tourism, nature conservation and exploitation of regional products.
  4. The important role of regional identities as a barrier or bridge, depending on historical development, should be carefully analysed to reach appropriate objectives.
  5. The crucial role of common integral development initiatives between the cross-border regions, e.g. water management, nature conservation, recreation, education.
  6. Water appears as a key issue in threats due to the role of rivers and lakes as border features, e.g. water pollution, increasing dynamics in rivers, which may result in fragmentation, flooding, irrigation and increased water use. Therefore, international co-operation between municipalities/local governments concerning water management is vital.
  7. The lack of linear features and infrastructure in the border areas, as a result of different development of land uses. Planning of linear features such as ecological corridors between the regions should be a priority for European spatial planning. The lack of adequate infrastructure often results in poor communication and public transport networks having negative impact on alternative employment opportunities and ultimately on the development potential of the areas as a whole.
  8. Agriculture and forestry play an essential role in shaping the transfrontier landscapes and in maintaining economically viable local communities. It is essential to keep these sectors sustainable in order to preserve the environment of the regions.
  9. Natural parks and protected natural areas are common to all the case studies. They offer a new initiative to promote co-operation between the cross-border regions.

**TABLE 3. Review table of the SWOT analyses presented in the case studies.**

|                         | <b>STRENGTHS</b>   | <b>WEAKNESSES</b>   | <b>OPPORTUNITIES</b>   | <b>THREATS</b>   |
|-------------------------|--|---|--|--|
| <b>ECONOMICAL</b>       | <p>Outdoor recreation activities</p> <p>Local products with high quality/designation of origin</p> <p>Summer houses</p>  | <p>Uncertainty on public financing</p> <p>Low profitability in farms</p> <p>Deficient tourism infrastructure</p> <p>Weak market development</p> <p>Deficient communication systems</p> <p>Conflicting land uses</p> <p>Too large properties: lack of innovation and low investment from land owners</p> | <p>Use image of local products to sustain production</p> <p>Potential multifunctionality</p> <p>Increasing consumer demand for quality food products</p> <p>Integrated eco-tourism</p> <p>Expansion of European park area</p> <p>Potential exploitation of natural resources</p> <p>Local development initiatives between both regions/countries</p> | <p>Over-exploitation of natural resources</p> <p>Growing recreational use without planning</p> <p>Agribusiness may decrease quality of labelled products</p> <p>Non-regularised urbanisation (second residences)</p> <p>Land abandonment by farmers</p>  |
| <b>SOCIO-CULTURAL</b>   | <p>Rich cultural landscape heritage</p> <p>Traditional rural settlements well maintained with little urban development</p> <p>Regional identity</p> <p>Network of volunteer organisations</p> <p>Low density of population</p> <p>Well-studied areas</p> <p>Good access by public transport</p> <p>Involvement by stakeholders in integral care for the system</p> | <p>Aging population</p> <p>Emigration to urban areas</p> <p>Differences in regional identity between the two regions</p> <p>Tourism development in conflict with cultural values</p> <p>Poor environmental education</p> <p>Impact of past history (civil wars, invasions)</p>                          | <p>Growing regional identity</p> <p>Development of research</p>  | <p>Loss of cultural heritage</p> <p>Decrease of accessibility to rural areas</p> <p>Increased pressure from society to build in natural areas</p> <p>Loss of architectural tradition</p> <p>No jobs for local population</p> <p>Low professional base in the regions</p>   |
| <b>ENVIRONMENTAL</b>    | <p>Landscape of international value due to unique features</p> <p>Heterogeneity in landscape with aesthetic values</p> <p>High biodiversity</p> <p>Low human influence</p> <p>Environmental tourism facilitated</p> <p>Good spatial organisation into restricted and public areas</p> <p>Integrated ecological monitoring</p>                                      | <p>Sensitive ecosystem</p> <p>Heterogeneity and biodiversity mainly depends on linear features</p> <p>No corridors in landscape</p> <p>Loss of river natural essences due to dam construction</p> <p>Unbalanced temporal and spatial grazing</p>  | <p>Dynamic features that may shape landscape in the future (e.g. river)</p> <p>Landscape management (including monitoring) will keep cultural values and rich flora</p> <p>Conservation activities related with natural parks</p>  | <p>Growing air, water, soil and noise pollution</p> <p>Water conflicts: increasing river fragmentation, flooding, irrigation, increasing water use</p> <p>Intensive use of natural resources</p> <p>Climate change</p> <p>Increase in plant diseases</p> <p>Land use changes</p> <p>Decrease in landscape management</p> <p>Uncontrolled tourism</p> |
| <b>LANDSCAPE POLICY</b> | <p>Bilateral agreement on nature conservation</p> <p>Commitment for international co-operation on highest political level</p> <p>Well-established organisation, including private and public bodies</p> <p>Execution and demonstration of integrated projects</p> <p>Protection through legislation on both sides of the border</p>                                | <p>Slow process of international co-operation</p> <p>Different management between regions involved</p> <p>Different legislation</p> <p>Lack of integrated plan to manage the region and its sustainable development</p> <p>Frontier zones are sometimes forbidden to study and visit</p>                | <p>Creation of transboundary parks</p> <p>International co-operation regarding river and water management</p> <p>New orientations of CAP, especially rural development regulation</p> <p>World Heritage diploma</p> <p>More co-operation with bordering accession countries</p>  | <p>CAP accelerates land cover changes</p> <p>Uncertainty about complete execution of projects planned</p>  |

## 6 Conclusions

The case studies presented in this report illustrate the diversity of Europe's landscapes, their natural areas, their agricultural production systems, their cultural values, their capacity to retain and attract population, and the crucial role they play in local economies. The review of the case studies presented in the previous section highlights their unique added value which stems from their transfrontier character. Based on the main outcomes of the SWOT analyses presented by the European experts in this report, the authors arrived at the following conclusions:

1. The European Landscape Convention principles of integration and consistency are essential to transfrontier landscapes. Exchange of experience and information between the bordering areas through integrated research projects, common management of natural areas and common educational programmes will avoid isolation and promote integration. This co-operation should take place at different spatial levels ranging from local municipalities to pan-European. The consistency principle is especially relevant for transfrontier landscapes because it avoids conflicts between the different regional identities recognised in most of the case studies presented. Consequently, investment in promoting cultural identity is important in areas especially affected (e.g. ex-communist countries).
2. Common legislation on environmental matters is vital to protect the environment of the transfrontier areas, which strongly supports the coming into force of the European Landscape Convention. Existing successful examples of international co-operation, such as the river and water management co-operation between Belgium and The Netherlands, or the landscape ecology research project on Atlantic mountains between Portugal and Spain, should be stimulated and supported at a European level.
3. The concept of the European Landscape Typology linking up with information of biogeographic features might be used for analysing and comparing landscapes at the European level. In a second phase, socio-cultural and economic profiles should be used to further identify similar types. Finally, specific policy measurements aiming to protect, manage and develop those landscapes could be undertaken for each landscape type.
4. The need for a common EU strategy on landscapes, which considers the specific potential role of transfrontier landscapes as existing links between cross-border regions.
5. The World Heritage Diploma should be considered as an opportunity to strengthen co-operation and raise local identity.
6. The crucial role of transfrontier landscapes in those EU countries bordering with Accession and/or Candidates countries should be recognised, to stimulate the development of Less Favoured Areas. The new developments in the CAP policy, including the agri-environmental schemes, are therefore very relevant to transfrontier landscapes, which include large areas where rural development is a key issue.
7. Tourism is a key issue in the interchange of socio-cultural aspects between the border regions and basic to the economic development of the areas. Special attention should be given to the sustainable development of tourist areas, which includes the exploitation of natural resources (e.g. geothermal waters, fishing, hunting, water sports) and land use changes (e.g. reforestation using exotic species and disafforestation, urbanisation in peri-urban areas, ski areas, pasture abandonment). In addition, a balance should be found between the wishes of both local and wider society in terms of economic development and nature conservation.
8. The spatial planning of linear features and the bi-lateral use of the existing ones (e.g. rivers) in frontier areas is important to implement integration and consistency principles.

In conclusion, the separating role that many transfrontier landscapes are playing at present, might be turned into one of making connections at various levels, e.g. by contributing to an economic and social cohesion of the bordering regions through common spatial planning. The authors are convinced that the key issues presented in this report will help to justify EU investment in common transfrontier policies, to initiate and/or facilitate the processes of integrated planning maintaining balanced relationships between transfrontier areas.

## References

- Braudel, F. 1985. The Mediterranean. In: *The Mediterranean. The space and the history*. Paris. First published in French by Arts et Metiers Graphiques in 1977 Flammarion/Champs, pp. 9–11.
- Budowski, G. 1998. Vice-Rector, United Nations University for Peace, Costa Rica, www.upeace.org.
- Cancela d'Abreu, A., Pinto Correia, T. and Oliveira, R. 2001. Identification and characterisation of landscapes as a support for spatial planning: application in Portugal. INTERREG IIC; Direcção General do Ordenamento do Território e Desenvolvimento Urbano e Ministério do Ambiente e Ordenamento do Território Secretaria Regional do Ambiente dos Açores.
- CEC 1998. Regulation (EC) No. 2760/98 of the Commission of 18 December 1998 on the Implementation of a Programme for Cross-Border Co-operation within the scope of the PHARE Programme, Commission of the European Communities, Brussels.
- CEC 2000. The communication of the Commission to the Member States of 28 April 2000 on the guidelines for the Community Initiative regarding trans-European co-operation to promote a harmonised and balanced development of the European area INTERREG III, K(2000) 1101. Commission of the European Communities, Brussels.
- Cerovskó, J. 1998. Transfrontier Protected Areas Along the Former Iron Curtain in Europe. In: Phillips, A. 1998. Parks for Peace – International Conference on Transboundary Protected Areas as a Vehicle for International Co-operation 16–18 September 1997 Somerset West, near Cape Town, South Africa, Conference Proceedings (Draft of January 1998), p. 117–121.
- Council of Europe, 2000. European Landscape Convention – Explanatory Report and Convention, Florence.
- Eager, D. 2003. The landscape or the characteristics: which comes first? Verbal contribution during The Cardiff European Landscape Conference 2003: Assessment and policy, 7–9 December (not published).
- Eleftheriadis, N. and Tsalikidis, I. 1990. Coastal Pine Forest Landscapes: Modelling Scenic Beauty for Forest Management. *Journal of Environmental Management*, 30: 47–62.
- Groom, G., Haines-Young, R., Kienast, F., Kindler, A., Krönert, R., Potschin, M. and Wascher, D. 2003. ELCAI Landscape Character Assessment definition; Meeting organisation ELCAI meeting Birmensdorf (Zürich) Switzerland, not published.
- Hamilton, L.S., Mackay, J.C., Worboys, G.L., Jones, R.A. and Manson, G.B. (Eds.). 1996. *Transborder Protected Area Co-operation*. Canberra, Australia, Australian Alps National Parks and IUCN.
- IUCN 1990. Parks on the Borderline: Experience in Transfrontier Conservation. Background papers presented at the Border Parks Workshop, Vancouver, Canada, October 1988; Ed: Jim Thorsell. IUCN-The World Conservation Union, Gland, Switzerland, 97 pages.
- IUCN 1999. Parks for Life: Transboundary Protected Areas in Europe, Robert Brunner, in collaboration with the EUROPARC Federation (FNNPE) and the World Commission on Protected Areas (WCPA) of the World Conservation Union (IUCN).
- Langer, H. 1994. Ökologische Bausteine für unser gemeinsames Haus Europa = Ecological Bricks for A Common Europe (1990). In: Politische Ökologie, Beiheft 2., Ökom Verlag, München, 63 pages.
- Lovelock, J.E. 1979. Gaia: A New Look at Life on Earth. Oxford University Press.
- Malassis, L. 1992. Pasado y devenir de los paisajes agrícolas. In: Electa (Ed). *Paisaje mediterraneo*. Elemond Editori Associati, Milan.
- Mata Olmo, R., Harráiz, S., Gómez Mendoza, J., Allende Álvarez, F., López Estébanez, N., Molina Holgado, P. and Galiana Martín, L. 2003. Atlas de los Paisajes de Espana. Ministerio de Medio Ambiente, Universidad Autonoma de Madrid, FEDER/INTERREG IIC, 683 pages, 1 fold-out map and CD-Rom.
- Mazurek, H. and Blanchemanche, P. 1992. La organización del paisaje rural mediterráneo de los pueblos a las fincas de pastoreo. In: Electa (Ed). *Paisaje mediterraneo*. Elemond Editori Associati, Milan.
- MCPFE 1998. Ministerial Process on Protection of Forests in Europe, European Forest Process indicators, Conference Proceedings 1998.
- Mücher, C.A., Bunce, R.G.H., Jongman, R.H.G., Klijn, J.A., Koomen, A., Metzger, M. and Wascher, D.M. 2003. Identification and Characterisation of Environments and Landscapes in Europe. Wageningen, Alterra, Green World Research. Alterra-Report 832. 113 pp.; 33 figs.; 19 tables; 102 refs.
- Nowicki, P. (ed.) 1998. The Green Backbone of Central and Eastern Europe, European Centre for Nature Conservation, ECNC Publication Series on Man and Nature, Vol. 3, Tilburg, 165 pages.
- Ott, W.R. (1978) Environmental Indices: Theory and Practice. *Ann Arbor Science*, Michigan.
- Quezel, P. 1985. Definition of the Mediterranean region and the origin of its flora. In: Gómez-Campo, C. (Ed.) Plant Conservation in the Mediterranean Area. Junk. p. 17.
- Russell, R.J. and Kniffen, F.B. 1969. Culture Worlds, Brief Edition: revised, London: The Macmillan Company, pp. 59–203.
- Sandwith, T., Shine, C., Hamilton, L. and Sheppard, D. 2001. Transboundary Protected Areas for Peace and Co-operation. Report based on the proceedings of workshops held in Borneo (1998) and Gland (2000). Published by the World Commission on Protected Areas (WCPA); in the series Best Practice Protected

- Area Guidelines Series No. 7, Series Editor Adrian Phillips, IUCN-The World Conservation Union, Gland, Switzerland, 28 pages.
- Sanò, M. and Fierro, G. 2002. Integration of the SWOT Analysis as a Coastal Management Tool with a Geographical Information System: Two Approaches to the Problem and First Results, Tesi di Laurea, Università degli Studi di Genova, 9 pages.
- Steiner, F. 1991. *The Living Landscape; an ecological approach to landscape planning*. McGraw Hill, New York.
- Troumbis, A., Moreno, J.M. and Medail, F. 2001. *Biodiversity and Conservation in Changing Mediterranean Landscapes*. Report from a RICAMARE Workshop, Mytilini, Lesvos, Nov. 27–29, 2000, Research In Global Change in the Mediterranean: A Regional Network; Report MEDIAS/GB/db/2001–222, 36 pages.
- UNEP 1999. *Global Environment Outlook 2000 (GEO-2000)*, Earthscan Publications.
- Wascher, D.M. 2003. *Overview on Agricultural Landscape Indicators Across OECD Countries*; In: Dramstad, W. and Sogge, C. 2003. *Agricultural impacts on landscapes: Proceedings from NIJOS/OECD Expert Meeting on Agricultural Landscape Indicators in Oslo, Norway October 7–9, 2002*. Developing indicators for policy analysis, Norwegian Institute for Landscape Inventory, Ås 2003 NIJOS report 07/2003, 350 pages.
- Wascher, D.M. and Jongman, R.H.G. (Eds.) 2004. *European landscapes – classification, evaluation and conservation*. A report submitted to the European Environment Agency, by LANDSCAPE EUROPE in collaboration with the European Centre for Nature Conservation, Tilburg (in press).



## Learning from European Transfrontier Landscapes

The development and implementation of a common framework for landscape policies is a crucial issue at European level. This report is meant as a contribution to the preparatory work for the implementation of the European Landscape Convention and highlights ongoing European initiatives to develop common methodologies and criteria for landscape assessment. Learning from European Transfrontier Landscapes focuses on transfrontier landscapes, and presents 14 case studies from the Mediterranean, Atlantic and Central European regions, which are the result of a volunteer collaboration by a large group of national and international experts. The studies seek to highlight the Strengths, Weaknesses, Opportunities and Threats (SWOT) related to specific transfrontier landscapes characteristics and their current land use trends. They illustrate that despite great bio-geographic and cultural differences, transfrontier landscapes have a unique added value, which stems from their intrinsic peripheral character. The outcomes of the presented studies encourage national and international policies and challenge planners and scientists to develop specific tools and concepts.



Landscape Europe Secretariat,  
Alterra Wageningen UR,  
P.O. Box 47,  
NL-6700 AA Wageningen (The Netherlands)