

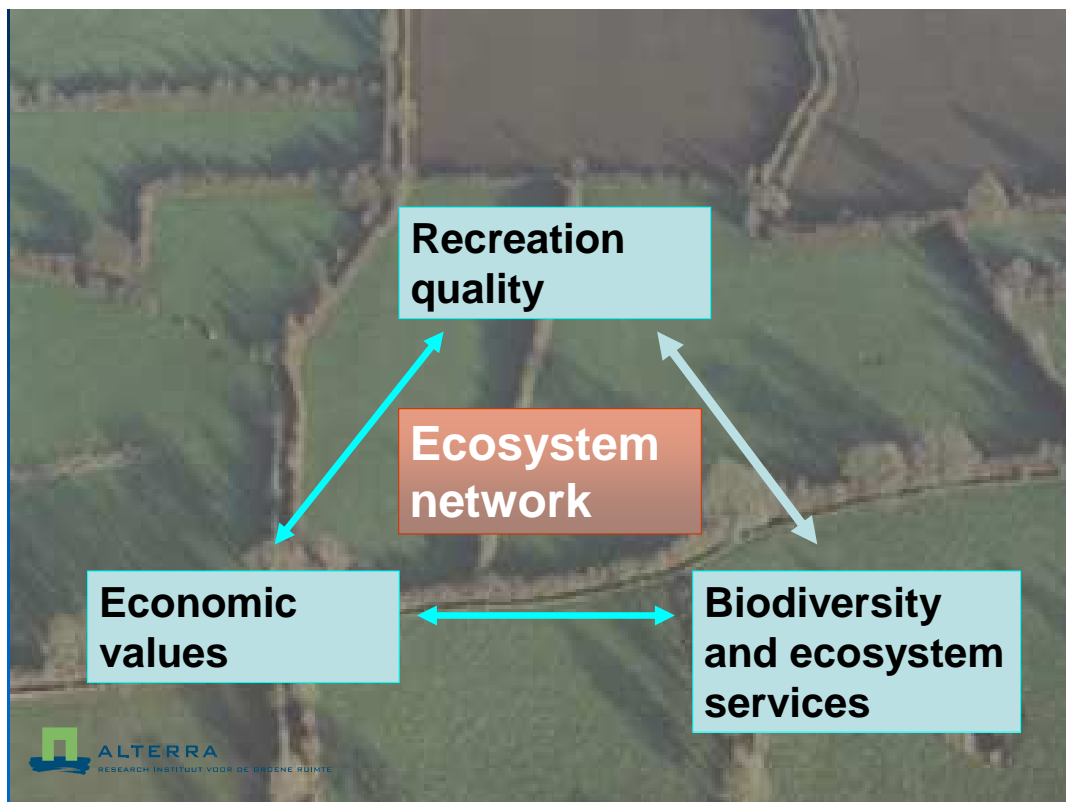
## Wageningen University Landscape Center

# Landscape Ecology MSc-thesis topics

## Minor Landscape Ecology

2007-2008

Landscape ecology takes the landscape as object of study, and aims to understand the functioning of landscapes in relation to human induced change. It has an explicit spatial focus, and an emphasis on the hierarchical relationships between local, regional, national and global scales. Landscape ecology is the interface between ecology and spatial planning and design.



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## Where is landscape ecology all about?

Landscape ecology in the spatial planning department is aiming to improve the ecological quality of spatial planning and design. This includes finding ways to make ecological knowledge and methods better usable in planning and design processes, as well as new ecological concepts which facilitate the role of ecological systems in landscape development.

In this document, MSc students will find a program of 6 MSc thesis topics in landscape ecology.

Sustainable landscape development is the context of this program. Landscapes are defined as geographical regions which developed in the interplay between natural and human induced processes. Landscapes are continuously adapted by humans to better meet their future economic, social and ecological needs. Spatial planning and design of landscapes should follow the principles of ecological sustainability. However, there is a wide gap between ecological knowledge and its application in planning and design. By consequence, most regional planning does not comply with the basic principles of sustainable development. The MSc projects below contribute to identifying and analyzing this problem, to expanding the awareness of responsible actors, and to solving the problem by linking front line ecology to planning, design and decision making in multi-actor groups.

Most MSc thesis research will be done in cooperation with researchers at Alterra, landscape center. You find their names under the different topics. Feel free to contact them for inquiries. Part of this program is affiliated with the Habiforum Research Program Innovative Land Use.



## 1. Adapting Landscapes for Climate Change

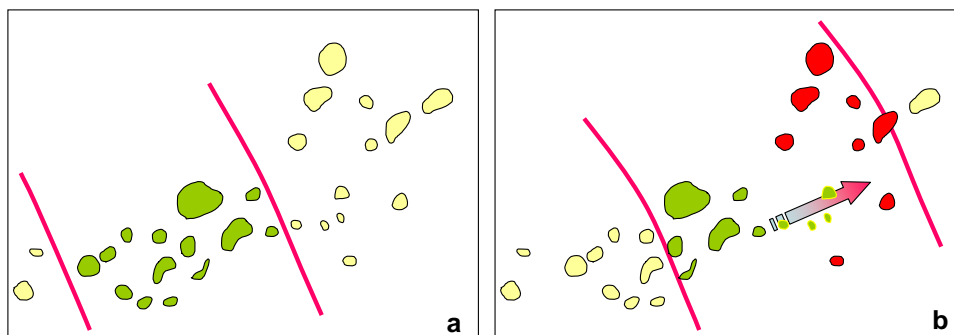
Climate change greatly affects ecosystems and biodiversity. Increased temperature cause changes in distribution patterns of species, whereas increased frequencies of extreme weather enlarge fluctuations of populations, accelerating local extinction processes. For nature policy and land management, climate change means nothing more than a shift in paradigms, from a conserving strategy focusing on protected reserves, towards a more dynamic and creative strategy, involving agricultural and urban landscapes.

Research in the Land Use Planning group and Alterra involves topics in spatial adaptation of ecosystem networks to improve the capacity of biodiversity to adapt to climate change. Current projects you can contribute to are focused on adaptation strategies for the National Ecological Network of the Netherlands, and on effects of climate change on species distributions (e.g. butterflies, birds) at various levels of scale, including the European Natura 2000 network.

Contact persons: Dr. Claire Vos [claire.vos@wur.nl](mailto:claire.vos@wur.nl), Dr. Jana Verboom [jana.verboom@wur.nl](mailto:jana.verboom@wur.nl), drs. Anouk Cormont, [anouk.cormont@wur.nl](mailto:anouk.cormont@wur.nl). Some projects are in collaboration with Vlinderstichting and SOVON.

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Due to increased temperature, species find their climate range shift north- or eastward. But can species adapt?

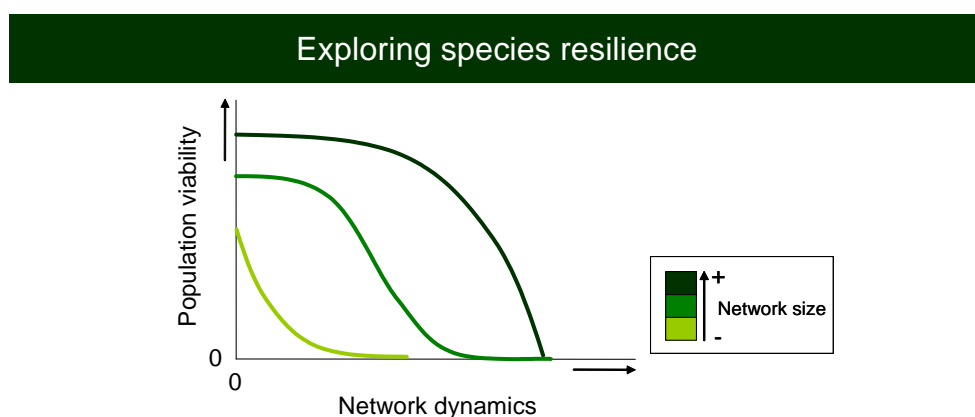
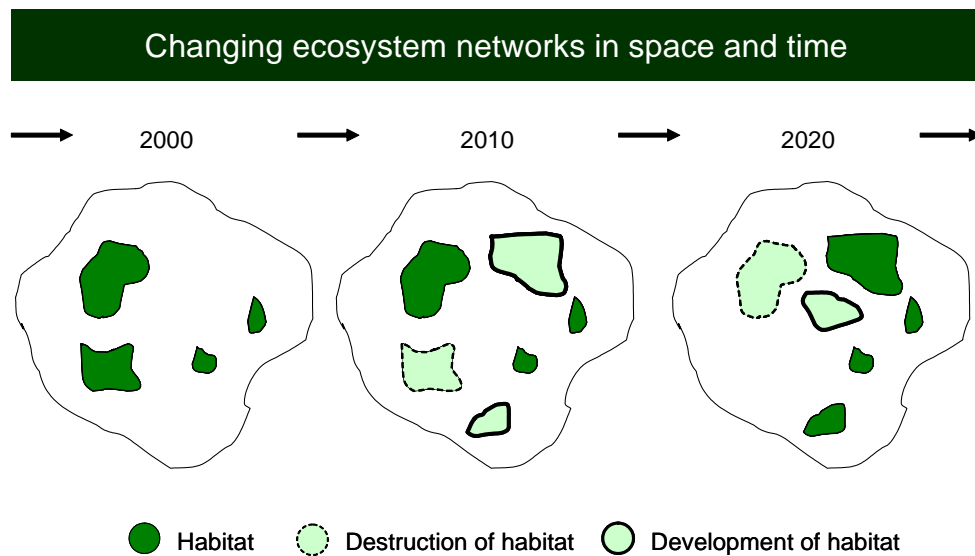


## 2. Resilience and dynamics in ecosystem networks

Ecosystem networks are the template for biodiversity in metropolitan and intensively used agrarian landscapes. Landscapes are continuously changed by humans, to make them better adapt to their social, economic or ecological needs. How can ecosystem networks change in harmony with such developing landscapes and still retain their capacity to sustain biodiversity?

Research projects of the Land Use Planning group and Alterra are focused on exploring the spatial and temporal limits of sustainable network change for different types of ecosystems and levels of species diversity. Also, attempts are made to make the concepts of landscape resilience and landscape memory operational for application in land use planning and design.

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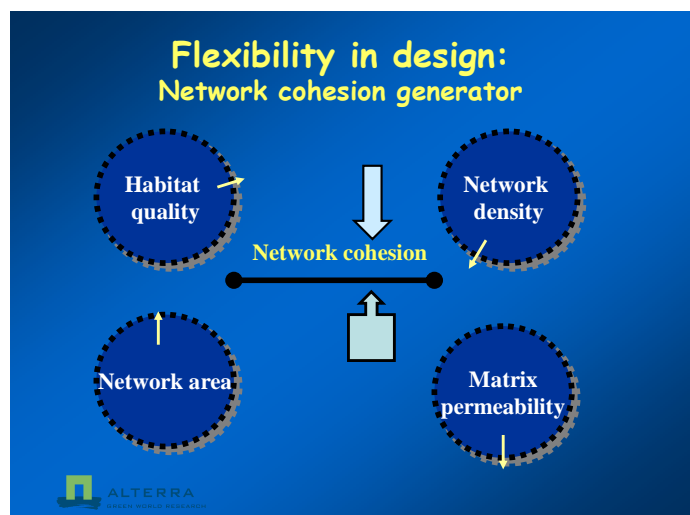
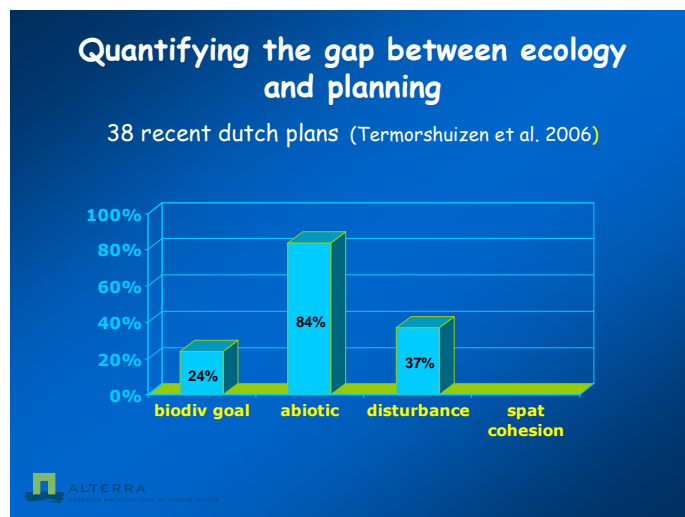


### 3. Planning and design guidelines for ecosystem networks

The ecological functioning of the landscape depends on the spatial coherence of landscape structures supporting ecological processes. For example, a certain level of biodiversity in a landscape requires specific minimum areas and connectivity of ecosystem sites in the landscape. Hence, the planned change of landscape need to be based on the close interaction between form and ecological function. The concept of ecosystem network (or similar concepts like ecological networks, greenways) might be helpful in the decision making process to realize ecological sustainability.

Research projects of the land use planning group and Alterra include evaluations of current landscape plans and designs for consistency of form and function and the development of guidelines, methods and tools for interactive planning, including internet applications. Research on the acceptance and the added value of the concept of ecosystem networks in planning practice is also foreseen. A project to learn more about characteristics that improve the application value of ecological knowledge in decision making for landscape change will be started in 2007.

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## 4. Combining land use functions in green networks

Ecosystem (green) networks are the template for biodiversity in heavily used landscapes, but can also serve to support a range of other land use functions, including recreation and water management functions, agricultural pest control, landscape identity and cultural heritage patterns. Hence, land use planning and design of multifunctional landscapes would benefit from the availability of proper design guidelines for multifunctional ecosystem networks. These include spatial requirements for other functions, as well as opportunities and limitations for combining functions in space.

Research projects by the Department of Land use Planning and Alterra include the design of ecosystem networks for combined purposes of recreation and biodiversity, and of nature conservation and pest control in farm landscapes. These projects are partly in cooperation with the Forest and Nature Policy Department and the Social Spatial Analysis Departments of WUR. Also, we seek to quantify the contribution of green structures in urban landscapes and office parks to rural networks.

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### Extend of pest control with robust and narrow elements added

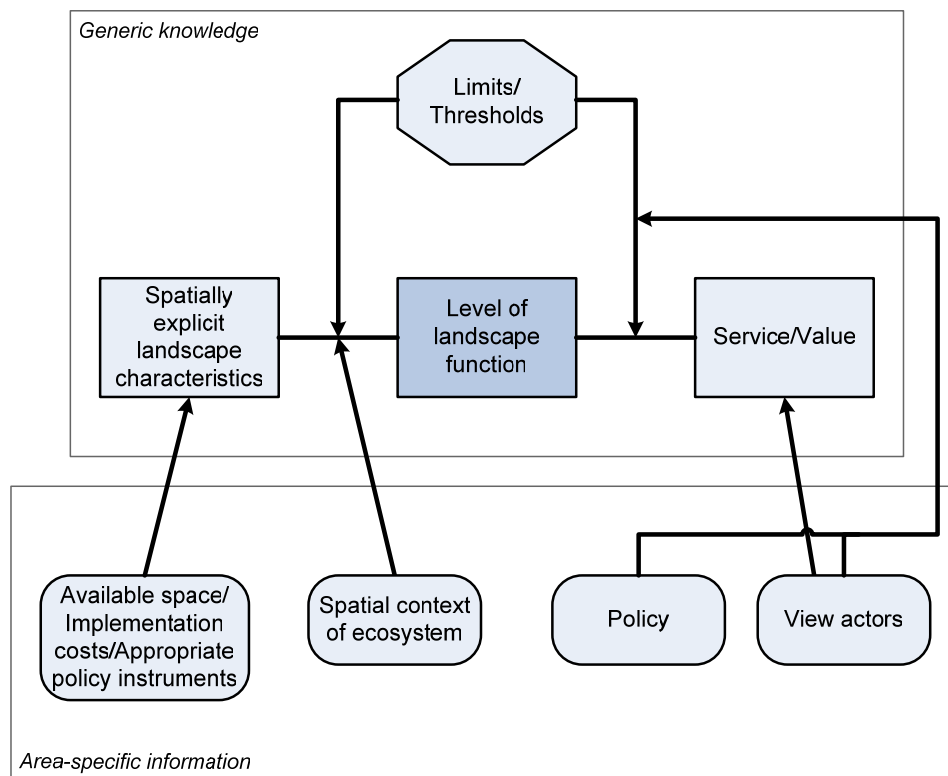


## 5 The economic and social values of ecosystem networks

Decision making on the future of landscapes is often dominated by the economic and social added value that will be generated by investments for landscape improvements. Integrating ecosystem networks into spatial planning and decision making by landscape stakeholders therefore requires that improvements in ecosystem networks can be translated into indicators for social and economic values. The relation must be understood between form of ecosystem network and function, and between function and economic and social value. The concept of landscape services is developed for this purpose.

Research in the Land Use Planning Group and Alterra include developing methods and indicators for applying landscape services in landscape planning, as well as quantitative estimations of added economic value of ecosystem networks, both in rural and urban landscapes.

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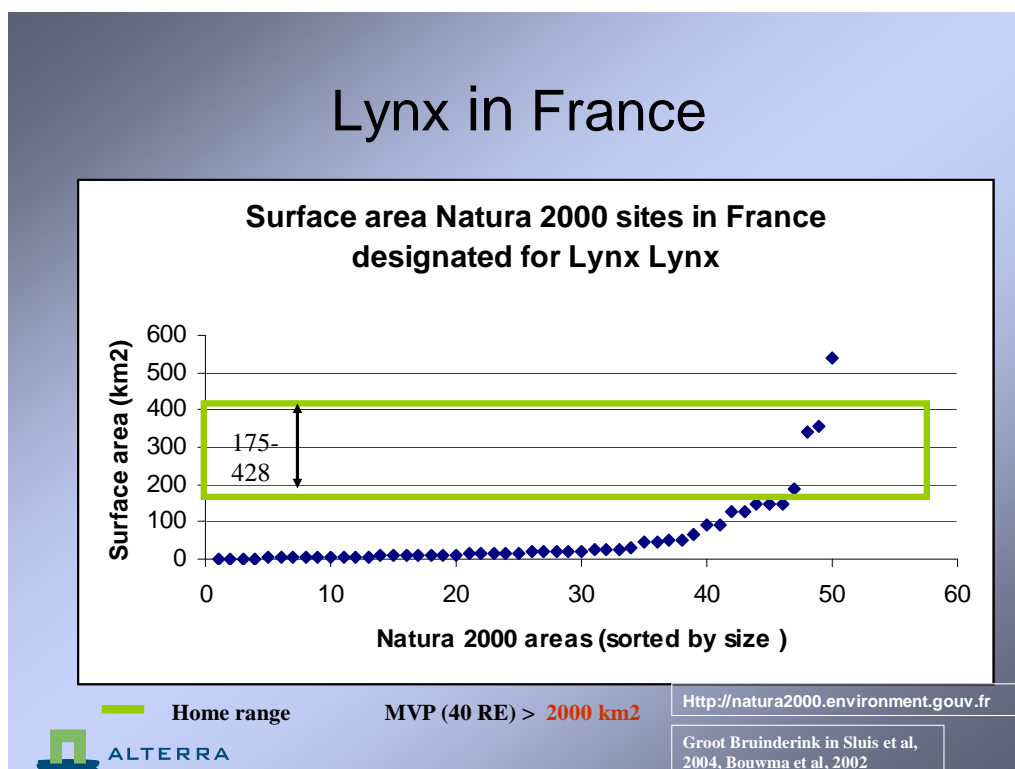


## 6. Planning ecosystem networks at different levels of scale

Ecological relationships occur over a wide variety of spatial scales. From a species point of view, spatial scale levels at which sustainable conditions are feasible may vary between the scale of the local community, the scale of the province or county, the scale of The Netherlands as a whole, or even the scale of parts of Europe. Goal setting for biodiversity conservation must incorporate this variety. Because most landscape planning decisions are made at the level of municipalities, the hierarchical organization of ecological systems ask for complex decision making, in which different levels of scale are incorporated.

Research projects in the land use planning group and Alterra include the ecological interaction between greenblue networks in the agrarian landscape and the National Ecological Network EHS (for example, the contribution of greenblue networks to connectivity of the EHS). Some projects focus on the ecological relationships and network design on the European regional level (Carpathian mountains) or European level (Natura 2000). You may also contribute to projects about the significance of roads to the spatial cohesion of habitat networks.

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## More reading

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WAGENINGEN UNIVERSITY

University for Life Sciences

wil je

# landschapsecologie

in je onderwijsprogramma?

kies dan voor

## Plannen en ontwerpen met ecosysteemnetwerken in een multifunctioneel landschap<sup>LUP-90806</sup>

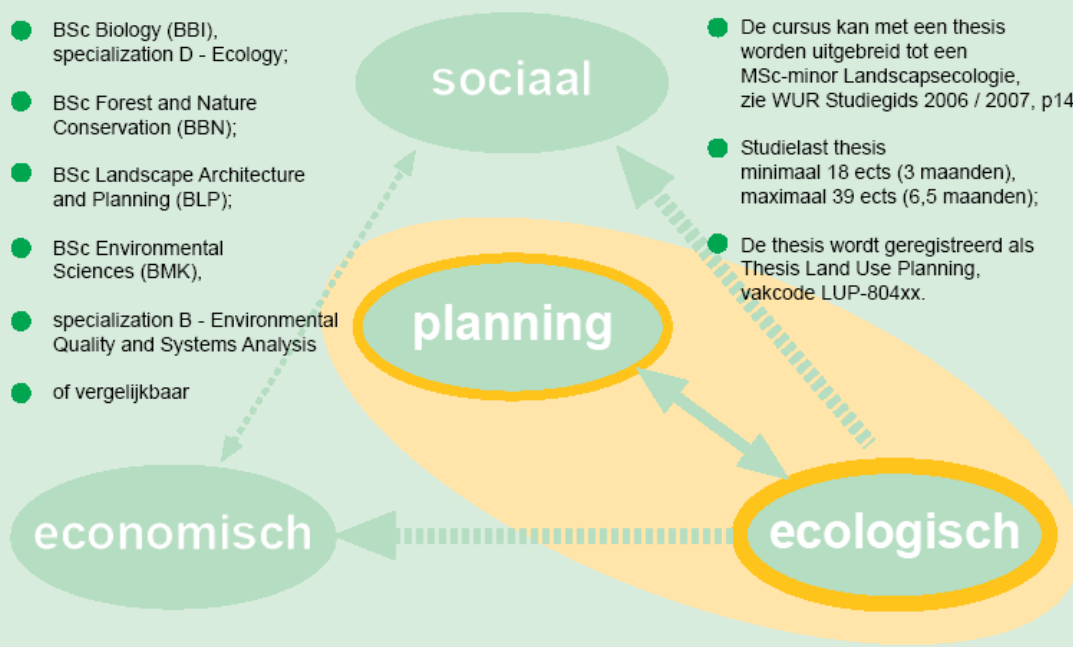
Ontdek hoe landschapsecologische kennis  
kan worden benut bij duurzame ontwikkeling  
van ons landschap

### Welke basisopleiding?

- BSc Biology (BBI), specialization D - Ecology;
- BSc Forest and Nature Conservation (BBN);
- BSc Landscape Architecture and Planning (BLP);
- BSc Environmental Sciences (BMK),
- specialization B - Environmental Quality and Systems Analysis
- of vergelijkbaar

### Uitbreiden tot Minor Landschapsecologie

- De cursus kan met een thesis worden uitgebreid tot een MSc-minor Landschapsecologie, zie WUR Studiegids 2006 / 2007, p146;
- Studielast thesis minimaal 18 ects (3 maanden), maximaal 39 ects (6,5 maanden);
- De thesis wordt geregistreerd als Thesis Land Use Planning, vakcode LUP-804xx.



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